THE IRON TRADE REVIEW

VOLUME XXXI. CLEVELAND, O. JANUARY 20, 1898. CHICAGO, ILL. NUMBER 3

MAGNOLIA METAL

For All Machinery Bearings.

MAGNOLIA METAL CO.

Owners and Sole Manufacturers.

FOR SALE BY ALL DEALERS.

266 and 267 West St., NEW YORK.

CHICAGO: Traders' Building. LONDON: 49 Queen Victoria St., E.C.

Beware of Fraudulent Imitations

Moore's Anti-Friction DIFFERENTIAL CHAIN HOIST.

Adjustable Automatic Brake.
Self sustaining at every point.
Highest Efficiency
A New Movement.
A Perpetual Compound Lever.
Powerful, Simple and Durable.
Light, Compact and Strong.

NINE SIZES.

Half Ton to Ten Tons Capacity.

ALSO

HAND POWER CRANES, WINCHES, &c.

Moore Manufacturing Co.,

CLEVELAND, O.

FORSTER, WATERBURY & Co.

INCORPORATED.

PIG IRON, STEEL, ORE, COKE.

636-638 Rookery, CHICAGO.

THE CHICAGO SCREW CO.

TRADE MARK

SCREWS

94-108 W. WASHINGTON ST. CHICAGO

DICKMAN & MACKENZIE,

CLEVELAND, 71 Atwater Bldg.

CHICAGO, 1234 Rookery Bldg

Mining properties examined. Ores sampled at mines, furnaces and all lake ports.
General analyses of Ores, Slags, Metals, Fuel Foundry Materials and Products, etc.

CHEMISTS AND ENGINEERS.

"CAHALL" VERTICAL WATER TUBE BOILERS MANUFACTURED BY THE AULTMAN & TAYLOR MACHINERY CO. MANSFIELD — OHIO

"BABCOCK & WILCOX" HORIZONTAL

SEND FOR CATALOGUE.

CAHALL SALES DEPARTMENT,

Bank of Commerce Building, PITTSBURG, PA.

145 Taylor Building, New York City, N. Y.
The "Rookery," Chicago, Ill.
542 Drexel Bldg., Philadelphia, Pa.
1015 Tremont Bldg, Boston.

ENTERPRISE BOILER COMPANY

YOUNGSTOWN, O.

Draught Stacks, Blast Furnaces and Heavy Plate Work a Specialty.

Write for Estimates.

HAND POWER — BELT — HOISTING MACHINERY — CRANES — STEAM — ELECTRIC

THE CASE MFG. CO. COLUMBUS, O. U.S.A.

METAL STAMPING.

We do all kinds of SMALL STAMPING and FORMING, from Steel, Iron or Brass, from your Dies or we can make Dies for you.
Send sample or sketch for price.

THE OLIVER P. CLAY CO.

416 Arcade, Cleveland, Ohio.

DYNAMO BELTINGS

ST. LOUIS, MO

New York Boston, Philadelphia.

Cleveland Tool and Supply Co., Agts., Cleveland, O.

"Metallurgy of Cast Iron," Price $3.

The A B C of Iron, Now $1.

POWER TRANSMISSION

W. A. JONES FOUNDRY & MACHINE Co.

53-59 So. JEFFERSON ST. CHICAGO

WORKS, SHANUN. MINES, CLEARFIELD CO., PA.

James V. Rose.

. . . PROPRIETOR . . .

SHARON FIRE BRICK WORKS,

Contractor in Fire Brick Construction.
Manufacturer of High Grade Fire Brick.

ANALYSIS:

Brick.		Rock Clay.	
SILICA,	54.50.	SILICA,	47.00.
ALUMINA,	44.20.	ALUMINA,	39.00.
LOSS ON IGN,	.05.	LOSS ON IGN,	13.30
IRON,	.15.	IRON,	.22.

SHARON, ... PA.

APOLLO GALVANIZED IRON.

Who says that one make is sa good as another? The jobber who deals in some other make; and the worker whose work is rough, or does not know Apollo.

Apollo Iron and Steel Company, Pittsburgh, Pa.

12

TURNBUCKLES.

Cleveland City Forge & Iron Co.,

CLEVELAND, O.

Headquarters for . . . . . GENUINE CONNELLSVILLE COKE

Post Office, PITTSBURG, PA.

Mines and Ovens in the Connellsville Coke Region, Penna.

For Blast Furnaces and Foundry Cupola Work; also Crushed Connellsville Coke (substitute for Anthracite Coal) for manufacturing and domestic purposes. 13,500 Ovens. Daily Capacity 30,000 tons of Coke. Direct connections with all Railroads entering the Region. Quotations, Freight Rates, Pamphlets giving full information, promptly furnished on application.

See large Advertisement of

B. F. STURTEVANT CO.,

Boston, Mass.,

On Page 24.

BLOWERS, FANS, ENGINES.

INGOT MOLDS — IRON CASTINGS — LIGHT AND HEAVY

ROLLS

SAND AND CHILLED BRASS AND COPPER CASTINGS

THE UPSON NUT CO., Cleveland, O.

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MACHINE AND CARRIAGE BOLTS, HOT FORGED AND COLD PUNCHED NUTS, LAG SCREWS, BOLT ENDS, WASHERS ETC. Catalogue and Prices on Application.

Draft Stacks, Galvanizing Pots, Tank Cars.

WM. B. POLLOCK & CO.

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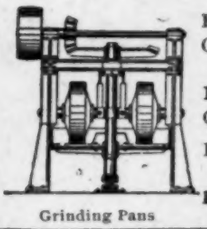
Blast Furnaces, Steel Plants, Boilers, Tanks, etc.

SHARPSVILLE FOUNDRY and MACHINE CO.
LIMITED,
SHARPSVILLE, PA.

Contractors and Builders
—OF—



Grinding Pans

Blast Furnaces, Open Hearth Steel Furnaces, Heating Furnaces, Gas Producers, etc.

Iron and Brass Castings, Bronze Tuyeres.

Miller, Wagoner & Bentley,

PIG IRON, STEEL, ORE, COKE.

Columbus, O., Hayden Bldg.
Chicago, Ill., Monadnock Bldg.
St. Louis, Mo., Bank of Com. Bldg.

IT PAYS TO ADVERTISE IN
THE IRON TRADE REVIEW.

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PATENT LIME-EXTRACTING
HEATER AND FILTER
COMBINED.

Is the only lime-extracting Heater that will prevent Scale in Steam Boilers, removing all impurities from the water before it enters the boiler.

Thoroughly Tested.

OVER 8,000 OF THEM IN DAILY USE.

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DAYTON, OHIO.
CHICAGO OFFICE, 63 S. Canal St.

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Rock Drills.

Channelers.

We manufacture Air Compressors suitable for all kinds of work, and a variety covering every size, from the small Belt-driven Compressor for small shops and pumping small quantities of water, up to the large Corliss Compound Compressors for the greatest manufacturing or mining plants of the world. As an instance of the wide range covered by Compressors of our make, we name the following that we have recently furnished, all of whom are equally distinguished in their line:

Newport News Shipbuilding Co., Newport News, Va.; Duplex Compressor for operating a large number of pneumatic tools; Hughes Bros. & Bangs, Bellevue, Del.; Valdosta Water Works, Valdosta, Ga., for pumping water; the Manhattan Elevated R. R. Co., New York, for machine shop purposes; Walker Co., Electric Works, Cleveland, Ohio; Harrison Granite Co., Barre, Vt., pneumatic tools; L. L. Manning, Plainfield, N. J., Marble Works; the Anaconda Copper Mining Co., Butte, Montana.

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AIR LIFT.
PUMPS, ETC.

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O. TEXTOR,
Chemist and Metallurgist

Analyses made of Metals, Ores, Fuels and Supplies for Furnaces, Steel Works and Foundries.
Ores sampled at mines, furnaces and lake ports.
Advice furnished to operators of Blast Furnaces Steel Works and Foundries.
Mining properties reported upon.
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METAL FACTORS
The Products of and Supplies for
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...AND...
FRICK COKE.
929-939 ROOKERY BUILDING, CHICAGO.

F. A. EMMERTON,
Analytical Chemist,
AND METALLURGIST.

Ores sampled at lake ports, mines and furnaces.
Mines and Metallurgical Processes examined.
Analyses made of Ores, Metals, Fuels, Railroad and Foundry Supplies, etc.
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THE CENTRAL ELECTROTYPE AND ENGRAVING CO.
263-271 St. Clair St. Cleveland, O.
WOOD ENGRAVING
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ECLIPSE ELECTROTYPE AND ENGRAVING CO.
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TELEPHONE MAIN-1916 CLEVELAND, OHIO.

Wire Nail Machinery
30-INCH CHUCKING LATHES.
RADIATOR LOOP BORING MACHINES.
Wm. Glader, 160 & 162 So. Clinton st. Chicago

C. K. PITTMAN,
SHIPPER OF
Coal & Coke
Best Grades of Coke a Specialty.
978 Old Colony Building, Chicago

Lake Superior Iron Ore Shipments (Gross Tons)

NAME OF MINE.	Prior to 1881.	1881	1882	1883	1884	1885	1886	1887	1888	1889	1890	1891	1892	1893	1894	1895	1896	1897	TOTALS.
Marquette Range.																			
American (Sterl'g)	797	4,702	8,006	3,618	2,916	.....	.....	1,483	13,699	20,032	21,000	21,601	15,076	.....	.....	.....	.....	.....	112,933
Ames	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,103	5,196	.....	.....	.....	6,298
Barnum (B)	460,428	27,883	41,778	62,752	69,408	47,458	52,975	16,123	10,211	12,835	.....	.....	.....	.....	.....	.....	.....	.....	801,851
Bay State	14,187	583	1,236	621	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	16,637
Bessie	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	847	.....	.....	.....	.....	.....	.....	847
Beaufort	.....	.....	5,532	18,976	18,360	17,166	17,354	12,829	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	90,217
Blue	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	13,809	32,171	44,140	.....	2,519	92,639
Boston	6,478	14,824	18,245	20,190	2,218	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	587	.....	62,542
Buffalo (A)	.....	.....	.....	.....	.....	.....	10,860	24,686	30,801	50,919	100,464	.....	.....	.....	.....	.....	.....	.....	217,730
Brassted { Mitch'l	54,567	21,146	33,396	.....	.....	.....	7,017	16,419	4,091	.....	.....	.....	.....	.....	.....	.....	.....	.....	136,636
Brassted { Wint'p.	212,670	43,639	23,005	50,143	73,144	53,913	58,743	74,067	86,789	155,341	.....	.....	.....	.....	.....	.....	.....	.....	831,445
Cambria	36,458	19,246	64,545	47,508	59,742	50,796	58,784	41,130	57,861	72,780	80,359	34,662	41,549	30,445	47,218	41,656	35,086	110,648	990,473
Champion	830,480	145,427	159,009	104,960	210,180	173,915	137,593	146,330	174,680	215,098	223,442	133,413	109,979	61,648	42,788	100,398	113,375	141,728	3,224,443
Che-hire (Swanzey)	79,730	15,011	31,498	13,730	3,557	.....	8,328	2,842	.....	.....	.....	7,301	29,403	19,096	.....	6,593	.....	.....	217,089
Chicago	3,364	5,531	.....	117	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	9,012
Cleve'd-Cliffs I. Co.	2,226,510	198,569	206,120	218,219	225,674	218,757	203,664	207,441	184,316	274,048	331,713	221,788	310,907	218,105	143,706	221,153	513,119	718,408	6,842,217
Columbia (Klom'n	70,875	11,158	12,066	714	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	94,813
Curry	.....	.....	.....	.....	.....	.....	.....	.....	.....	16,671	.....	.....	.....	.....	.....	.....	.....	.....	16,671
Detroit	.....	.....	5,402	12,314	3,809	19,125	39,400	26,099	18,500	10,112	6,080	.....	.....	.....	.....	.....	.....	.....	140,841
Dexter	.....	.....	.....	4,878	16,202	750	.....	.....	1,821	3,895	9,136	5,448	13,000	7,833	21,740	13,752	18,903	1,154	118,512
Dey	.....	.....	.....	.....	2,709	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2,709
East Champion	69,856	3,408	4,002	5,639	.....	.....	.....	.....	.....	2,697	.....	.....	.....	.....	.....	.....	.....	.....	76,002
East New York	.....	.....	.....	.....	.....	.....	.....	.....	13,694	29,739	36,431	50,293	35,175	911	.....	.....	.....	.....	166,243
Edison	.....	.....	.....	.....	.....	.....	.....	.....	.....	893	.....	.....	.....	.....	.....	.....	.....	.....	893
Erie	.....	.....	2,731	5,405	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	8,136
Etna	.....	.....	.....	1,091	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,091
Fitch	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	16,550	15,093	.....	.....	.....	174	.....	.....	31,817
Foster (B)	105,938	3,011	11,648	10,029	9,675	9,643	.....	.....	.....	.....	21,949	.....	.....	.....	.....	.....	.....	.....	171,893
Gibson	.....	.....	.....	.....	.....	1,515	12,142	2,700	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	16,357
Goodrich	29,511	10,245	9,998	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	49,754
G'd Rapids (Davis)	.....	.....	.....	.....	.....	.....	.....	1,200	11,611	20,058	26,426	9,362	22,823	352	12,073	6,764	67	.....	110,736
Hartford	.....	.....	.....	.....	.....	.....	.....	.....	.....	569	.....	.....	5,678	6,513	.....	.....	1,532	.....	14,289
Hortense N.Ch'p'n	.....	.....	.....	.....	.....	.....	.....	886	5,685	7,757	16,246	.....	.....	.....	.....	.....	.....	.....	30,574
Humbolt	469,194	26,302	43,463	31,866	23,763	11,766	20,207	19,873	11,655	15,966	23,259	19,879	4,571	.....	.....	.....	2,297	.....	723,961
Iron Cliffs (K)	.....	.....	.....	.....	.....	.....	.....	87,346	78,520	134,616	188,776	278,270	289,395	130,812	253,760	259,042	.....	.....	1,700,537
Imperial	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	38,460	18,552	7,194	.....	.....	.....	.....	.....	64,206
Iron Mountain	.....	.....	.....	.....	.....	.....	.....	393	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	393
Jackson	2,076,223	118,939	96,830	71,278	83,251	68,657	89,370	109,906	101,909	128,891	124,682	92,979	92,567	51,009	32,298	42,186	80,710	79,102	3,540,787
Lake Superior	2,434,221	262,235	296,509	200,799	204,796	226,040	267,622	302,909	240,225	288,784	318,321	308,831	366,715	329,610	344,758	342,439	459,576	376,761	7,571,151
Lillie	65,395	16,748	27,494	4,614	2,683	708	3,957	23,041	32,692	33,916	31,812	19,551	29,005	68,861	78,388	54,285	107,532	112,781	713,373
Lucy (McComber)	224,294	28,051	40,406	14,676	.....	.....	.....	12,139	22,276	32,982	43,483	27,683	26,326	21,964	.....	.....	.....	10,033	504,313
Manganese	.....	.....	.....	397	1,484	3,111	1,367	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	6,359
Marquette (C)	.....	.....	.....	.....	.....	.....	5,229	20,441	7,060	70,128	23,692	16,802	9,555	.....	.....	.....	.....	.....	152,907
Mesabi's Friend	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5,503	10,540	.....	16,043
Michigamme	385,975	57,272	43,712	42,533	25,935	12,373	48,790	58,726	36,448	56,999	80,777	23,109	1,894	935	1,610	3,214	.....	.....	880,362
Milwaukee	14,083	31,645	40,891	805	25,991	38,465	46,693	50,490	48,908	52,727	24,763	.....	.....	.....	.....	.....	.....	.....	375,451
National	66,852	24,833	23,366	21,178	13,987	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	150,216
Negaunee	.....	.....	.....	.....	.....	.....	.....	5,256	45,304	78,318	76,188	64,218	85,846	69,732	132,581	90,682	175,394	182,169	1,005,991
" Con.Wks.	.....	.....	1,177	10,394	43	.....	1,094	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	12,708
New York (York)	924,927	50,074	56,806	1,517	1,677	.....	.....	5,128	.....	12,844	2,422	.....	11,230	25,000	21,487	.....	.....	.....	1,113,102
N. Y. Hematite	35,482	.....	2,105	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	37,587
North Republic	.....	.....	.....	.....	.....	.....	.....	.....	289	.....	.....	.....	.....	.....	.....	.....	.....	.....	289
Northwest	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,687	.....	.....	.....	.....	.....	1 687
Norwood	.....	.....	.....	.....	.....	.....	.....	2,200	3,553	.....	.....	.....	.....	.....	.....	.....	.....	.....	5,753
Nonpareil (St.Law.)	.....	.....	9,998	11,961	.....	.....	.....	1,436	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	23,395
Ogden	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	986	986
Palmer	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,041	.....	1,041
Pascoe	.....	.....	18,880	.....	12,605	18,249	10,072	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	59,806
Pendill	20,508	13,586	9,987	318	1,594	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	45,993
Phœnix (Dalliba)	.....	10,986	44,856	1,687	.....	.....	.....	1,605	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	59,114
Pioneer	.....	.....	.....	.....	.....	.....	5,140	1,203	9,066	.....	.....	.....	.....	.....	.....	.....	.....	.....	15,409
Pitts. & L. Angel'e.	507,637	18,060	14,326	27,259	86,922	111,051	131,731	191,129	223,600	229,070	261,681	241,605	287,517	351,973	355,453	318,555	342,251	489,685	4,184,496
Platt	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2,676	5,448	41,226	13,198	11,296	.....	73,844
Primrose	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	6,040	.....	6,040
Prince of Wales (A)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	32,415	.....	.....	.....	.....	.....	.....	.....	32,415
Quartz	.....	.....	.....	.....	.....	.....	.....	.....	.....	491	.....	.....	.....	.....	.....	.....	.....	.....	491
Queen (A)	.....	.....	.....	.....	.....	.....	.....	.....	5,527	66,122	109,217	.....	.....	.....	.....	.....	.....	.....	180,866
Queen Ir.M'g Co. (F)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	479,509	379 719	196,864	220,298	160,817	323,057	239,774	1,910,038
Republic	1,193,613	233,786	235,109	152,565	277,757	250,835	241,161	230,624	235,062	287,390	220,065	191,127	167,991	64,195	105,719	174,027	127,360	124,342	4,502,728
Repub. Reduc. Co.	.....	.....	.....	.....	.....	.....	.....	87	21,050	22.122	3,915	.....	.....	.....	.....	.....	.....	.....	47,174
Richards	.....	.....	.....	.....	.....	.....	.....	1,374	.....	.....	.....	.....	.....	.....	.....	.....	.....	6,887	8,261
Richmond	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,088	4,630	5,718
Riverside	.....	.....	.....	.....	.....	.....	.....	.....	5,622	3,712	.....	6,783	.....	43	.....	.....	.....	.....	16 160
Rolling Mill	220,146	1,668	163	1,528	1,820	3,437	4,403	1,058	402	.....	.....	.....	.....	.....	.....	.....	.....	3,975	238,600
Saginaw	389,981	30,793	16,276	9,108	946	.....	.....	.....	.....	.....	.....	4,320	.....	.....	.....	.....	.....	.....	451,424
Salisbury (B)	194,153	43,690	42,243	17,028	26,629	29,503	51,067	48,304	74,947	72,449	85,798	.....	.....	.....	.....	.....	.....	.....	686,411
Sam Mitchell	.....	.....	.....	.....	.....	.....	8,823	8,411	546	.....	.....	.....	.....	.....	.....	.....	.....	.....	17,780
Samson (Argyle)	223,507	4,584	12,421	15,700	1,334	.....	1,193	.....	4,512	2,796	1,218	.....	600	.....	.....	.....	.....	.....	267,805
Schadt	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,261	.....	.....	1,261
Section 12	5,357	13,243	3,287	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	21,887
South Buffalo (A)	.....	.....	.....	.....	.....	.....	.....	4,964	24,706	69,359	146,383	.....	.....	.....	.....	.....	.....	.....	245,412
Spurr	142,806	2,746	8,873	9,067	.....	.....	752	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	164,244
Star West (Wheat)	7,404	9,040	9,554	6,625	6,824	9,200	15,867	17,538	4,987	7,997	15,141	4,412	.....	.....	5,550	51,267	9,658	942	181,946
Taylor	1,110	10,559	15,146	6,155	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	32,970
Titan	.....	.....	1,778	13,128	19,411	23,340	13,865	16,003	2,846	.....	.....	.....	.....	.....	.....	.....	.....	.....	90,371
Volunteer	223,853	39,276	41,456	19,414	11,748	5,679	24,034	47,486	56,321	60,156	141,524	92,699	127,130	69,561	26,946	32,672	53,216	1,617	1,074,788
Webster	.....	.....	4,443	.....	934	.....	6,229	2 054	.....	448	.....	.....	.....	.....	.....	.....	.....	.....	14,108
West Republic	.....	7,354	27,865	30,734	19,628	12,700	10,558	12,872	9,861	1,510	.....	.....	.....	.....	.....	.....	.....	.....	131,077
Wetmore	.....	.....	1,777	2,777	4,585	5,887	10,756	3,335	2,074	19,679	.....	.....	.....	.....	.....	.....	.....	.....	50 870
Wheeling	.....	.....	.....	.....	4,098	6,383	.....	74	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	10,555
Winthrop	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	109,576	122,042	191,658	180 071	134,365	119,120	150,496	106,894	1,114,222
Total	14,019,480	1579,834	1829,394	1305,425	1558,034	1430,422	1627,380	1851,634	1923,727	2642,813	2993.664	2512,242	2666,856	1835,893	2059,330	2097,838	2604,221	2715,035	49,253,222
Mesabi Range.																			
Adams	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	59,141	234,562	175,802	469,505
Aetna (Lowmore)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,645	.....	.....	17,723	.....	19,368
Auburn	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	108,210	376,970	131,478	175,263	791,921
Biwabik	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	151,500	90,048	247,069	242,565	427,464	1,158,646
Canton	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	24,416	213,853	359,020	10,261	.....	613,550
Cincinnati	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	26,372	.....	17,187	57,324	32,912	133,795
Cloquet (Vega)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5,628	47,700	96,280	12,215	161,823
Commodore	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	65,137	7,213	.....	22,063	60,798	155,211
Duluth	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	37,626	.....	.....	.....	.....	37,626
Fayal	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	136,601	248,645	642,939	1,028,185
Franklin	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	46,617	223,399	286,423	231,086	30,128	817,653
Genoa	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	17,136	309,514	326,650
Hale	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3,616	24,167	31,004	70,006	13,728	142,521
Lake Superior	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	58,123	67,659	259,912	385,694
Mahoning	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	117,884	167,245	519,892	805,021
Minnewas	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	13,858	2,140	.....	.....	.....	15,998
Mtn. Iron (& Rath)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4 245	119,818	573,440	371,274	142,021	773,538	1,084,336
Norman	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	38,999	93,392	77,523	101,077	310,991
Ohio	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	28,943	69,925	47,350	146,218
Oliver (I)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	123,015	505,955	509,377	808,291	601,072	2,538,710
Penobscot	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	11,933	11,933
Roberts	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	18,614	18,614
Sellers	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	47,433	153,037	.....	200,470
Sparta	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	66,722	66,722
Williams (N. Cin'ti	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3,046	11,249	.....	14,295
Total	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4,245	613,620	1793,052	2781,587	2882,079	4 280,873	12,355,456
Miscellaneous	.....	.....	.....	.....	1,879	441	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2,320
GRAND TOTAL																			

A—Now Queen I. M. Co. F—Succeeds Buffalo Mining Co. B—Now Iron Cliffs. K—Under Cleve'd-Cliffs I. Co. after '95. I—Mesabi Mtn. and Lone Jack. C—1893 and later in Winthrop.

NAME OF MINE.
Menominee Range.
Antoine
Appleton
Aragon
Armenia
Beta
Breen
Brier Hill
Calumet
Chapin
Claire
Columbia (H)
Comuonwealth
Cornell
Crystal Falls
Cundy (Quinnesec)
Curry (G)
Cyclops (G)
Delphie
Dunn
Emmett
Fairbank
Florence
Great Western
Groveland
Half and Half
Hamilton
Hemlock
Hersel
Hiawatha
Hollister
Hope
Indiana
Iron River
Keel Ridge
Lee Peck (D)
Lincoln
Loretto
Ludington
Manganese
Mansfield
Mastodon
Metropolitan
Michigan Explo.Co.
Millie (Hewitt)
Monitor (Lamont)
Nansimo
Northwestern
Norway (G)
Paint River
Penn Iron M'f'g Co.
Perkins
Perry
Pewabic
Selden
Sheridan
South Mastodon
Stephenson
Sturgeon River
Vulcan (G)
Walpole
Youngstown
Total
Vermillion Range.
Chandler
Minnesota
Pioneer
Zenith
Total
Gogebic Range.
Anvil
Ashland
Atlantic
Aurora
Bessemer
Blue Jacket
Brotherton
Cary (and Superior)
Chicago
Colby (E)
Comet
Davis
Eureka
Father Hennepin
Federal
First National
Germania
Imperial
Iron Belt
Iron Chief
Iron Chief No. 2
Ironton
Jack Pot
Kakagon
Mikado
Montreal
Newport
Nimikon
Norrie
Odanah
Pabst
Palms
Peuce
Ruby (Puritan)
Section 33
Shores
Sparta
Sunday Lake
Superior
Tilden
Trimble
Tyler's Forks
Valley
Windsor
Total
GRAND TOTAL

Ore Shipments (Gross Ton

Supplement to THE IRON TR

9	1890	1891	1892	1893	1894	1895	1896	1897	TOTALS.	NAM
										Meno
032	21,000	21,601	15,076	.....	.....	.....	.....	.....	112,933	Antoi
.....	.....	.....	.....	1,103	5,195	.....	.....	.....	6,298	Apple
835	.....	.....	.....	.....	.....	.....	.....	.....	801,851	Arag
.....	.....	.....	.....	.....	.....	.....	.....	.....	16,637	Arme
.....	.....	847	.....	.....	.....	.....	.....	.....	847	Beta
.....	.....	.....	.....	.....	.....	.....	.....	.....	90,217	Breen
.....	.....	.....	.....	13,809	32,171	44,140	.....	2,519	92,639	Brier
.....	.....	.....	.....	.....	.....	.....	587	.....	62,542	Calun
919	100,464	.....	.....	.....	.....	.....	.....	.....	217,730	Chapi
.....	.....	.....	.....	.....	.....	.....	.....	.....	136,636	Claire
341	.....	.....	.....	.....	.....	.....	.....	.....	831,445	Colun
780	80,359	34,662	41,549	30,445	47,218	41,656	95,086	110,648	990,473	Comu
098	223,442	133,413	109,979	61,648	42,788	100,398	113,375	141,728	3,224,443	Corne
.....	.....	7,301	29,403	19,096	.....	6,593	.....	.....	217,089	Cryst
.....	.....	.....	.....	.....	.....	.....	.....	.....	9,012	Cundy
948	331,713	221,788	310,907	218,305	143,706	221,153	513,119	718,408	6,842,217	Curry
.....	.....	.....	.....	.....	.....	.....	.....	.....	94,813	Cyclo
571	.....	.....	.....	.....	.....	.....	.....	.....	16,671	Delph
112	6,080	.....	.....	.....	.....	.....	.....	.....	140,841	Dunn
895	9,136	5,448	13,000	7,833	21,740	13,752	18,903	1,154	118,512	Emme
.....	.....	.....	.....	.....	.....	.....	.....	.....	2,709	Fairb
697	.....	.....	.....	.....	.....	.....	.....	.....	76,002	Flore
739	36,431	50,293	35,175	911	.....	.....	.....	.....	166,243	Great
593	.....	.....	.....	.....	.....	.....	.....	.....	893	Grove
.....	.....	.....	.....	.....	.....	.....	.....	.....	8,136	Half
.....	.....	.....	.....	.....	.....	.....	.....	.....	1,091	Hami
.....	16,550	15,093	.....	.....	.....	174	.....	.....	31,817	Hemle
.....	21,949	.....	.....	.....	.....	.....	.....	.....	171,893	Herse
.....	.....	.....	.....	.....	.....	.....	.....	.....	16,357	Hiawa
.....	.....	.....	.....	.....	.....	.....	.....	.....	49,754	Hollis
958	26,426	9,362	22,823	352	12,073	6,764	67	.....	110,736	Hope.
566	.....	.....	5,678	6,513	.....	.....	1,532	.....	14,289	India
757	16,246	.....	.....	.....	.....	.....	.....	.....	30,574	Iron
966	23,259	19,879	4,571	.....	.....	.....	2,297	.....	723,961	Keel
616	188,776	278,270	289,395	130,812	253,760	259,042	.....	.....	1,700,537	Lee P
.....	38,460	18,552	7,194	.....	.....	.....	.....	.....	64,206	Lincol
.....	.....	.....	.....	.....	.....	.....	.....	.....	393	Loret
891	124,682	92,979	92,567	51,009	32,298	42,186	80,710	79,102	3,540,787	Ludin
784	318,321	308,831	366,715	329,610	344,758	342,439	458,578	376,761	7,571,151	Mang
916	31,812	19,551	29,005	68,861	78,388	54,285	107,532	112,781	713,373	Manst
982	43,483	27,683	26,326	21,964	.....	.....	.....	10,033	504,313	Masto
.....	.....	.....	.....	.....	.....	.....	.....	.....	6,359	Metro
128	23,692	16,802	9,555	.....	.....	.....	.....	.....	152,907	Michi
.....	.....	.....	.....	.....	.....	5,503	10,540	.....	16,043	Millie
999	80,777	23,169	1,894	935	1,610	3,214	.....	.....	880,362	Monit
727	24,763	.....	.....	.....	.....	.....	.....	.....	375,451	Nansi
.....	.....	.....	.....	.....	.....	.....	.....	.....	150,216	North
318	76,488	64,218	85,846	69,732	132,581	90,682	175,394	182,169	1,005,991	Norwa
.....	.....	.....	.....	.....	.....	.....	.....	.....	12,708	Paint
844	2,422	.....	11,220	25,000	21,487	.....	.....	.....	1,113,162	Penn
.....	.....	.....	.....	.....	.....	.....	.....	.....	37,587	Perkin
.....	.....	.....	.....	.....	.....	.....	.....	.....	289	Perry
.....	.....	.....	1,687	.....	.....	.....	.....	.....	1,687	Pewab
.....	.....	.....	.....	.....	.....	.....	.....	.....	5,753	Selden
.....	.....	.....	.....	.....	.....	.....	.....	.....	23,395	Sherid
.....	.....	.....	.....	.....	.....	.....	.....	986	986	South
.....	.....	.....	.....	.....	.....	.....	1,041	.....	1,041	Stephe
.....	.....	.....	.....	.....	.....	.....	.....	.....	59,866	Sturge
.....	.....	.....	.....	.....	.....	.....	.....	.....	45,993	Vulca
.....	.....	.....	.....	.....	.....	.....	.....	.....	59,114	Walpo
.....	.....	.....	.....	.....	.....	.....	.....	.....	15,409	Young
70	261,681	241,606	287,517	351,973	355,453	313,555	342,251	489,685	4,184,496	
.....	.....	.....	2,676	5,448	41,228	13,198	11,296	.....	73,844	Tota
.....	.....	.....	.....	.....	.....	.....	6,040	.....	6,040	
.....	32,415	.....	.....	.....	.....	.....	.....	.....	32,415	
91	.....	.....	.....	.....	.....	.....	.....	.....	491	**Vermil**
22	109,217	.....	.....	.....	.....	.....	.....	.....	180,865	
.....	.....	479,509	379,719	106,864	240,298	160,817	323,057	289,774	1,910,038	Chand
80	230,065	191,127	167,991	64,195	105,719	174,027	127,360	124,342	4,502,728	Minne
22	3,915	.....	.....	.....	.....	.....	.....	.....	47,174	Pionee
.....	.....	.....	.....	.....	.....	.....	.....	6,887	8,261	Zenith
.....	.....	.....	.....	.....	.....	.....	1,088	4,630	5,718	
12	.....	6,783	.....	43	.....	.....	.....	.....	16,160	Tota
.....	.....	.....	.....	.....	.....	.....	.....	3,975	238,600	
.....	.....	4,320	.....	.....	.....	.....	.....	.....	451,424	
49	85,798	.....	.....	.....	.....	.....	.....	.....	686,411	**Gogeb**
.....	.....	.....	.....	.....	.....	.....	.....	.....	17,780	
96	1,218	.....	600	.....	.....	.....	.....	.....	267,805	Anvil
.....	.....	.....	.....	.....	.....	1,261	.....	.....	1,261	Ashla
.....	.....	.....	.....	.....	.....	.....	.....	.....	21,887	Atlan
59	146,383	.....	.....	.....	.....	.....	.....	.....	245,412	Auror
.....	.....	.....	.....	.....	.....	.....	.....	.....	164,244	Besse
97	15,141	4,412	.....	.....	5,550	51,207	9,658	942	181,946	Blue J
.....	.....	.....	.....	.....	.....	.....	.....	.....	32,970	Broth
.....	.....	.....	.....	.....	.....	.....	.....	.....	90,371	Cary
56	141,524	92,699	127,130	69,561	26,946	32,672	53,216	1,617	1,074,788	Chicag
48	.....	.....	.....	.....	.....	.....	.....	.....	14,108	Colby
10	.....	.....	.....	.....	.....	.....	.....	.....	133,077	Comet
79	.....	.....	.....	.....	.....	.....	.....	.....	50,870	Davis
.....	.....	.....	.....	.....	.....	.....	.....	.....	10,555	Eureka
.....	109,576	122,042	191,658	180,071	134,365	119,120	150,496	106,894	1,114,222	Fathe
										Federa
13	2,993,664	2,512,242	2,666,856	1,835,893	2,059,330	2,097,838	2,604,221	2,715,035	49,253,222	First
										Germa
										Imperi
.....	.....	.....	.....	.....	.....	59,141	234,562	175,802	469,505	Iron B
.....	.....	.....	.....	1,645	.....	.....	17,723	.....	19,368	Iron C
.....	.....	.....	.....	.....	108,210	376,970	131,478	175,263	791,921	Iron C
.....	.....	.....	.....	151,500	90,048	247,069	242,565	427,464	1,158,646	Ironto
.....	.....	.....	.....	24,416	213,853	359,020	16,261	.....	613,550	Jack P
.....	.....	.....	.....	26,372	.....	17,187	57,324	32,912	133,795	Kakag
.....	.....	.....	.....	.....	5,628	47,700	96,280	12,215	161,823	Mikad
.....	.....	.....	.....	65,137	7,213	.....	22,063	60,798	155,211	Montr
.....	.....	.....	.....	37,626	.....	.....	.....	.....	37,626	Newpo
.....	.....	.....	.....	.....	.....	136,601	248,645	642,939	1,028,185	Nimik
.....	.....	.....	.....	46,617	223,399	286,423	231,086	30,128	817,653	Norrie
.....	.....	.....	.....	.....	.....	.....	17,136	309,514	326,650	Odana
.....	.....	.....	.....	3,616	24,167	31,004	70,006	13,728	142,521	Pabst
.....	.....	.....	.....	.....	.....	58,123	67,659	259,912	385,694	Palms
.....	.....	.....	.....	.....	.....	117,884	167,245	519,892	805,021	Pence
.....	.....	.....	.....	13,858	2,140	.....	.....	.....	15,998	Ruby
.....	.....	.....	4,245	119,818	573,440	371,274	142,021	773,538	1,984,336	Sectio
.....	.....	.....	.....	.....	33,999	93,392	77,523	101,077	310,991	Shores
.....	.....	.....	.....	.....	.....	28,943	69,925	47,350	146,218	Sparta
.....	.....	.....	.....	123,015	505,955	509,377	808,291	601,072	2,538,710	Sunda
.....	.....	.....	.....	.....	.....	.....	.....	11,933	11,933	Super
.....	.....	.....	.....	.....	.....	.....	.....	18,614	18,614	Tilden
.....	.....	.....	.....	.....	.....	47,433	153,037	.....	200,470	Trimb
.....	.....	.....	.....	.....	.....	.....	.....	66,722	66,722	Tyler'
.....	.....	.....	.....	.....	.....	3,046	11,249	.....	14,295	Valley
.....	.....	.....	.....	.....	.....	.....	.....	.....		Winds
.....	.....	.....	4,245	613,620	1793,032	2781,587	2882,079	4280,873	12,355,456	Tota
.....	.....	.....	.....	.....	.....	.....	.....	.....	2,320	Grand

Under Clev'd-Cliffs I. Co. after '95. I—Mesabi Mtn. and Lone Jack. C—1893 and l

s Tons) for 1897 and the Past Forty-two Years.

ON TRADE REVIEW, Cleveland. [Vol. XXXI, No. 3.

TOTALS.	NAME OF MINE.	Prior to 1881	1881	1882	1883	1884	1885	1886	1887	1888	1889	1890	1891	1892	1893	1894	1895	1896	1897	TOTALS.
	Menominee Range.																			
112,933	Antoine																27,931	110,821	98,847	237,599
6,298	Appleton													4,377	5,618		2,107			12,102
801,851	Aragon										1,745	46,609	96,829	167,948	127,901	138,209	183,296	95,809	149,594	1,007,940
16,637	Armenia										50,275	26,649					2,045			78,969
847	Beta							1,585	1,226				1,400							4,211
90,217	Breen	17,430																		17,430
92,639	Brier Hill			10,593	4,388															14,981
62,542	Calumet			5,847	29,239	3 627														38,713
217,730	Chapin	34,556	134,521	247,506	265,830	230,972	157,455	198,871	336,128	290,871	518,990	742,843	488,749	660.052	489,134	235,895	618,589	420,318	643,402	6,774,682
136,636	Claire													57,352	9,612					66,964
831,445	Columbia (H)			15.948	4,334	6,774		14,282	2.377	10,936	11,395	60,133	70.770	57,682	22,426	10,300	70,867	87,202	24,623	470 039
990,473	Commonwealth	9,643	97,410	115 862	21,494	34,622	42,947	51,189	56,609	61,818	108,515	116,786	134,982	249,113	151,291	174,921	208,880	93,707	98,283	1,828,071
3,224,443	Cornell	30,856	11,816					4,566	2 064											49,302
217,089	Crystal Falls			1,341								3,974					13,037	44,526	95,210	158,088
9.012	Cundy (Quinnesec)	120,315	43,711	44,240	21,676	16,995	14,110	13,442	6,585	2,219							761	3,395	41,942	329,421
6,842,217	Curry (G)	34,654	17,534	13,374	3,676	10,079	4,897			5,376	28,722	72,162	100,681	125,773						416,928
94.813	Cyclops (G)	66,554	12,644	18,287	22,675	24,099	49,897	37,189	14,297	14,693	6,101	7,361	10,599	1,697						286,093
16,671	Delphic				3,410	508	9,880	17,648	2,272									52		33,770
140,841	Dunn								24,677	118,096	151,828	156,963	162,721	133,666	58,590	24,538	90,885	47,081	31,062	1,060,107
118,512	Emmett	66,007	648																	66 655
2,709	Fairbank			8,045	455															8,500
76,002	Florence	14,143	100,501	160,155	40,232			8,210	79 399	142,585	196,269	218,570	48,806	48,246	9,634	2,726	22,820	35,136	37,594	1,165 026
166,243	Great Western			587	22,825	20,710		22,267	23,239	21,860	38,454	72,546	62.464	87,487	661			14,643		387,743
893	Groveland												1,049							1,049
8,136	Half and Half										5,961	1,496	67							7,524
1,091	Hamilton							872	600	8,801	8,347	17,072	58,197	2,183						96,072
31,817	Hemlock												35,531	65,459	11,323		949	94,645	96,032	303,939
171,893	Hersel											955								955
16 357	Hiawatha														1,683		1,201			2.884
49,754	Hollister											2,020	1,057	1,021						4,098
110,736	Hope													15,543	2,275					17,818
14,289	Indiana			4,280	4,362	636	2,739	5,854												17,871
30,574	Iron River			24,115	100,369	52 584	55,693	78,591	83,018	110,900	179,238	155,458	59,345	1,176						904,587
723,961	Keel Ridge	11,496	19,511	23,425	5,033									5,997	3,298		19,441			88,201
1,700,537	Lee Peck (D													2,844						2,844
64,206	Lincoln												1,813	26,019	8,757					36,589
393	Loretto														8,131	55,983	53,160	34,331	54,104	205,712
3,540,787	Ludington	8,816	3,374	52,152	102 632	101,165	124,194	74,454	101,553	61,883	116,297	97,355	141,303	15,777	109	354				1,001,518
7,571,151	Manganese											6,844								6,844
713,373	Mansfield											18,303	49,836	69,259	69,558				37,182	244,138
504,313	Mastodon			3,477	18,577	18,187	11,737	41,640	48,794	51,463	63,511	66,526	45,370	9,150	23,485		23,733	60		425,708
6.359	Metropolitan			23,854	36,643	27,577		6,393	9,070	3,490										107,027
152.907	Michigan Explo.Co.														505	77	1,071		216	1,869
16.043	Millie (Hewitt)		4,352	9,500	7,516	7,927	4,627	5,517	1,163	11,124	12,274	39,232	5,889	6,780		13,962	10,924	21,815	10,374	172,076
880,362	Monitor (Lamont)										12,348	31.139	26,226	42,819	13,777	2,600				128 909
375,451	Nansimo			2,480	29,221	37,620		5,400	30,460	5,744		3,441	13,200							127,566
150,216	Northwestern				7,202	10,004														17,206
1,095,991	Norway (G)	278,960	137,077	165,547	114,836	71,710	67,741	93,878	95,726	87,200	68,044	61,717	4,089	44,767						1,291.352
12,708	Paint River			6,515	5,973	11,652	2,373	13,933	10,240	12,506	32,700	62,654	45,435	18,380						222,371
1,113,102	Penn Iron M'f'g Co.														280,450	175,274	290,622	179,917	237,886	1,164.149
37,587	Perkins	62,661	60,406	73,648	76,514	38,120	18,020	12,852	10,834	16,684	12,354	11,971					2,161			3ŏ7,225
2ŏ9	Perry				3,138															3,138
1 687	Pewabic											26,991	64,507	115,273	165,745	304,010	262,551	273,587	279,855	1,492,519
5,753	Selden							790	1,302											2 092
23,395	Sheridan										1,102	595	7,137	45,745	2,234		16,754	3,419	146	77.132
986	South Mastodon									2,722	4,005	1,476								8,203
1,041	Stephenson	23,887	10,856					1,018	3,589											39,350
59,806	Sturgeon River								6,829	7,800	4,775									18 404
45,993	Vulcan (G)	187,343	85,274	94.042	79,874	101,722	124,125	143,939	205,036	129.541	153,900	104,986	78,967	179,904						1,668,654
59,114	Walpole								1,740	900	9,614	2,940	3 895							19,089
15,409	Youngstown			6,198	15,292	8,344		25. 635	34,418	12,699		44,460	3.705				13		661	151,425
4,184,496																				
73.844	Total	967,321	739,635	1136,018	1047,415	895,634	690,435	880,006	1193,343	1191,101	1796,754	2282.237	1824,619	2261,499	1466,197	1137,949	1,923,798	1,560,467	1,937,013	24,931,441
6,040																				
32,415	**Vermilion Range.**																			
491																				
180,865	Chandler									54,612	306 220	336,002	373,969	651,655	435,930	558,050	605.024	471,545	438,365	4,231,372
1,910,038	Minnesota					62.124	225,484	304,396	394,252	457,341	535,318	532,000	517,570	498,353	370,303	390,463	432,760	448,707	592,196	5,761,267
4,502.728	Pioneer										3,144	12,012	3,079	2,651			40,054	149,073	207,103	417,116
47,174	Zenith													14,991	14,388			18,765	40,817	88,961
8,261																				
5,718	Total					62.124	225,484	304,396	394,252	511,953	844,682	880,014	894,618	1167,650	820,621	948,513	1,077,838	1,088,090	1,278,481	10,498,716
16 160																				
238,600	**Gogebic Range.**																			
451,424																				
686,411	Anvil								10,075	24,676	47,000	45,690	73	42,090		13,297	68,064	57,483		308,448
17,780	Ashland						6,741	74,015	175,563	174,183	257,915	435,949	267,439	231,896	66,067	83,020	126,096	91,149	111,625	2,101,658
267,805	Atlantic								1,369								70.989	60,727	50,307	183,392
1,261	Aurora						5,422	94,553	159,252	179,937	199,865	246,696	83,554	319,482	179,028	203,152	245,883	187,169	160,122	2,270,114
21,887	Bessemer							4,788	16,101											20,889
245.412	Blue Jacket								1,799											1,799
164,244	Brotherton							8,890	21,721	40,639	53,267	80,486	46,574	130,833	18,905	47,148	40,567	50,490	46,186	585.606
181,946	Cary (and Superior)										56,542	116,203	121,186	106,484	28,578	16,559	52,349	38,821	37,308	574,030
32.970	Chicago																	504		504
90,371	Colby (E					1,022	84,302	257,432	258,518	285,880	136,833	193 038	9,619	69,968	59,346	32,616		48,492	22,921	1,459 987
1,074,788	Comet											2,882	10,144	54,779	9,604	11,782				89,191
14,108	Davis											1,497		21,754	15,210		10 253			48,714
133,077	Eureka											23,794	13,907	10,655	31,385	18,329	26,105	4,544		128,719
50.870	Father Hennepin									28,721	76,545	63,903	15,759							184,928
10,535	Federal											21,150	6,778							27,928
1,114,222	First National								1,997											1,997
	Germania						5,468	19,734	61,714	53,918	103,169	52,000	22,383	4,283	7,964				1,015	331,648
9,253,222	Imperial													8,515						8,515
	Iron Belt									30,000	51,551	110,368	1,506	161,635	23,976	45,109	148,228	81,351	96,763	750,487
469,505	Iron Chief							9,950	2,249											12,199
19,368	Iron Chief No. 2							551												551
791,921	Ironton							18,424	24,762		8,635	6,247	300							58,368
1,158,646	Jack Pot													3,944	1,651				1,265	6,860
613,550	Kakagon							18,497	52,179	1,228										71 904
133,795	Mikado																4,788		11,397	16,185
161,823	Montreal							23,013	43,989	38,015	42,724	16,728	70,108	58,728	34,299	46,037	138,882	131,531	191,106	835.160
155,211	Newport							20,184	75,660	69,145	36 987	71,488	105,606	165,962	109,718	150,392	157,821	142,369	150,979	1,256,311
37,626	Nimikon							4,105	24,217	1,313										28,635
1,028,185	Norrie						15,419	124,844	237,254	412,196	674,394	906,728	758,572	985,216	472 062	621,608	738,480	329,068	604,281	6,880,122
817,653	Odanah							13.714	30,475	5,412	13,354	1,065		6,711	3.956	2.437				77,124
326,650	Pabst						1.103	17,979	19,906	49,876	116,376	172,060	130,226	113,245	104,510	206,074	219,960	68,984	220,496	1,440,895
142,521	Palms								1,414	9,725	35,245	50,604	32,227	102,382	2,658	37,911	46,965	114,108	207,153	640,392
385,694	Pence									26,687	574							13,185	120	40,566
805,021	Ruby (Puritan							16,388	45,000	3,058	9,472	11 694	913							86,525
15,998	Section 33										73,370	126,963	38,576	14,681						253,590
984,336	Shores																	12,196	16,102	28 298
310,991	Sparta													2,912			1,950			4,862
146,218	Sunday Lake						1,405	10.963	18,137			6,010	64,902	56,046	22,876	34,323	20,970	89,441	45.815	370,888
5,538,710	Superior							2,690	27,763			36,675	10,710	13,192		30,597				121,627
11,933	Tilden												28,415	233,356	135,118	209,077	418,188	250,205	276,890	1,551,249
18,614	Trimble							10,780	12,764	2,387										25 931
200,470	Tyler's Forks											10,683								10,683
66,722	Valley							1,878												1,878
14,295	Windsor										14,576	37,210	97	53,242	2,474		11,438	28,154	385	147,576
	Total					1,022	119,800	753,362	1322,878	1437,096	2008,394	2847,810	1839,574	2971,991	1329,385	1809,468	2,547,976	1,799,971	2,258,236	23.047,023
2,355,456																				
2,320	GRAND TOTAL	13.010,705	2319,469	2965,412	2352.840	2518,693	2466,642	3565,144	4762,107	5063,877	7292,643	9003,725	7071,053	9072,241	6065,716	7748,312	10.429,037	9,934,828	12.469,638	120088,178

C—1893 and later in Winthrop. D—Cherry Valley Ore. E—Includes Tilden up to 1891. G—1893 and later under Penn Iron Mining Co. H—Formerly Shafer, Sheiden, and Union.

THE IRON TRADE REVIEW

VOLUME XXXI. CLEVELAND, O. JANUARY 20, 1898. CHICAGO, ILL. NUMBER 3

THE WEEK IN IRON CIRCLES.

The week has brought the announcement of a "gentlemen's agreement" on steel rails, at the prices that have prevailed for some weeks; the termination of the selling organization of Lake Superior charcoal iron producers, and the formation of a new one including three furnace firms instead of eight; and the conference at Pittsburg of a committee of tin plate manufacturers, charged with perfecting a sweeping scheme of consolidation. The iron trade in general is still engaged in the attempt to strike the balance between the enormous consumption that has broken all traditions concerning the dullness of the turn of the year, and the equally unusual production. Thus far market facts have borne out the judgment of those who expect to find the supply steadily adequate to demand; though to be sure the season of the year when capacity will be fairly tested is yet some distance ahead. Buyers of pig iron are in general acting on the presumption that the present even adjustment of production and consumption will not be materially changed; for the time being the sellers willing to make slight concessions are numerous enough to encourage the waiting policy of many consumers. The increased fuel cost on Northern iron has not helped Southern sellers as yet to increase their sales in territory always marked by the sharpest competition between the sections. On the other hand there are producers who take a firm stand and whose order books support their position. It is a situation in which both bear and bull arguments lie on the surface. The attempt to read the situation five or six months hence must fall back finally upon considerations which underlie all financial operations and that go deeper than any analysis of stock and production statistics for two months or four months. The largely increased earnings of agricultural and artisan classes, and the greater buying capacity of the ultimate consumer, have been the chief arguments for continued large requirements of iron, and the railroad and implement industries have been prime factors in the demand already resulting. A more important consideration in gauging the probabilities of the year is the attitude of capital toward investments that would add to the volume of buying already in sight. New railroad work, electric railroad lines, new buildings, new industries—how much they will contribute to the tonnage of 1898 is yet an unsettled question. In the main it can be said that no marked change has taken place as yet in the feeling of capital concerning new enterprises. The past week has shown little or no change in market conditions. Large buying of pig iron has not yet set in. On foundry grades some Northern sellers are weaker. Gray forge is delivered at valley mill at $8.75, while the Pittsburg basis is $9 to $9.15. Bessemer iron is quiet after the buying by Northern Ohio works. Furnacemen are not willing to sell through the second quarter at $9.50, though several buyers have attempted to cover recently. Steel billets are higher at $15 to $15.25 Pittsburg. The market for rolled material shows special activity in pipe and sheets. The new rail agreement is on a basis of $18 Pennsylvania mill and $20 Chicago. None of the old pool features are revived and the best support of the arrangement is in the large tonnage booked and the incentive the Western mills will thus have to maintain the present price. Prices on all classes of material are stationary, with here and there concessions on business for early delivery.

THE CLEVELAND DISTRICT.

Progress on the 1898 agreement of Bessemer ore producers has been all that might be expected under the political distractions of the past fortnight. It is quite well settled that there will be an agreement among old-range companies. The one uncertainty relates to the Mesabi range. Those who were ready to assert early last year that an open market would be quite as profitable as an agreement on such a basis as that finally adopted, were convinced by the year's developments that the association really accomplished something in the matter of prices. Ores outside of it—the non-Bessemers and the Mesabis—failed to maintain their opening prices, low as these were. The experience, it appears, has not been overlooked by some Mesabi producers, at least. It would not be surprising to see early February sales, this year if the unsettled Mesabi question should be decided within the next fortnight.

Pig Iron. Foundry irons are a trifle weaker, though producers are not pushing long-delivery sales. Furnaces that would not meet $9.25, valley, for No. 2, a few weeks ago, are selling at that price and the weak sellers of December have gone somewhat lower. The price of coke and the prospective cost of 1898 ore seem to have an influence, however, on quotations for later months of the year. Bessemer iron is quiet. Buyers offer $9.50 for April, May and June deliveries, but furnaces have done comparatively little for second quarter on that basis and are holding off. The charcoal iron market is weak, and a nearer approach than ever is made to

Continued on page 7

CHICAGO.

OFFICE OF *The Iron Trade Review*,
1142 MONADNOCK BLOCK, Jan. 19.

Business shows a moderate increase week by week, but there are no especially heavy single transactions. The buying is mostly in small lots, and comes from a continually widening territory and an increasing number of buyers. Mills and furnaces report a satisfactory business placed last week and inquiries in hand for a considerable tonnage which will undoubtedly be closed up soon. The demand for all classes of iron and steel is expanding and dealers are expecting the next few weeks to be very good in the way of sales.

PIG IRON.—Sales last week included several quite large orders. Judging from the number and size of inquiries in hand transactions will be large for the next few weeks. Buyers appear to be satisfied that prices are as low as they will be for some time to come. The local furnaces are well sold ahead, having comparatively little iron to offer for the next six months. The Southern furnaces are in about as good shape, having well-filled order books, and small stocks on hand. The furnaces, both North and South, are generally firm, but some sales agents have been making prices a trifle shading those we quote. The dissolution of the charcoal iron selling company, the Superior Charcoal Iron Co., was not altogether unexpected. Firms which had acted as sales agents for various charcoal irons before the new arrangement naturally did their best to make up for the loss of the charcoal iron sales by increasing the tonnage of coke iron sold to former charcoal iron users. A considerable portion of this trade, the coke iron men claim, has been permanently taken from the charcoal furnaces. So far only one agency appointment has been made since the breaking up of the combined selling arrangement. Rogers, Brown & Co. have taken the agency for Hinkle furnace at Ashland, Wis., which they had before the combination was formed. Quotations on pig iron are unchanged:

Lake Sup. Charcoal	$12 50@13 00	South'n Coke No. 3	$10 10@10 35
Local Coke Fdy. No. 1	11 00@11 50	Southern No. 1 Soft	10 60@10 85
Local Coke Fdy. No. 2	10 50@11 00	Southern No. 2 Soft	10 35@10 85
Local Coke Fdy. No. 3	10 25@10 50	South'n Silveries	11 25@11 50
Local Scotch Fdy. No. 1	11 50@12 00	Jackson Co. Silveries	12 50@14 50
Local Scotch Fdy. No. 2	11 00@11 50	Ohio Strong Softeners	12 00@12 25
Local Scotch Fdy. No. 3	10 50@11 00	Alabama Car Wheel	16 00@17 00
South'n Coke No. 1	10 60@10 85	Malleable Bessemer	10 75@11 00
South'n Coke No. 2	10 35@10 85	Coke Bessemer	11 50@12 00

BARS.—Demand has been good and sales of a considerable tonnage were closed last week. The largest order came from an agricultural implement manufacturer, and was for several thousand tons. A number of good sized inquiries are in hand, and sales will be large for the next two or three weeks. Prices are unchanged at 1.05c to 1.10c for common iron, 1.10c to 1.15c for guaranteed, and 1.10c to 1.15c for soft steel bars from strictly billet stock.

CAR ORDERS.—The contract for the 300 ore cars of the Duluth & Iron Range, which has been hanging fire for some time, was given out last week, going to the Illinois Car & Equipment Co. These are all-steel, and will take a considerable tonnage of material of various kinds. Business in car material has been excellent, several good orders for axles and other forms of steel having been placed by the car works. A number of inquiries for cars are in the market, and orders will probably be placed very soon.

RAILS AND TRACK SUPPLIES.—Some orders for rails were taken by the local mills last week, but none of particularly large size. Quotations are unchanged, as follows: Rails, $20 to $22.50, according to specifications; steel splice bars, 1.20c to 1.30c; track bolts, with square nuts, 1.80c to 1.90c; hexagon nuts, 1.90c to 2c; spikes, 1.60c to 1.65c.

BILLETS AND RODS.—There has been considerable inquiry for both billets and rods, but the local mills have been unable to accept orders, being filled for several months ahead. Prices are about as last quoted—$17.50 for billets and $25.50 for rods.

STRUCTURAL MATERIAL.—The large Drainage Canal bridge, placed with the King Bridge Co., of Cleveland, last week, will take about 5,000 tons of material, most of which will be made in Pittsburg. There is some fear that the contract may not go through, as under the arrangement of the Drainage Board with the railroads which will use the bridge, the latter are to approve of any plans made before the contract is finally let. It is said that the railroads have not expressed approval of the plans under which this contract was let and may not do so. The matter will be finally settled this week, probably. Other business last week was light, and did not include any large orders. Quotations are made as follows: Beams, 15-inch and under, 1.30c to 1.35c; 18, 20 and 24-inch, 1.40c to 1.45c; angles, 1.15c to 1.25c; plates, 1.15c to 1.20c; tees, 1.35c to 1.40c. Small lots from stock are quoted at one-quarter to one-half cent higher.

PLATES.—Some quite good orders were given out last week, and the demand shows no signs of falling off. The local mills secured some business, but did not take any very large orders. Prices are made as follows: Tank steel, 1.15c to 1.20c; flange steel, 1.40c to 1.45c; fire-box steel, 1.85c to 5c.

SHEETS.—Considerable business has been placed in the week, nearly all of it in small lots. The demand is very satisfactory to the mills, the season considered. Quotations are made at 2.20c to 2.25c for No. 27 black and 80 and 7½ per cent discount for galvanized.

MERCHANT STEEL.—Transactions were quite numerous and some of them called for considerable tonnage. The demand appears to be increasing. Prices follow: Open-hearth spring, tire and machinery steel, 1.65c to 1.75c; smooth finished machinery steel, 1.60c to 1.65c; smooth finished tire, 1.45c to 1.50c; tool steel, 5.50c to 7.50c; specials, 11c and upwards.

SCRAP.—Dealers have been heavy buyers of scrap for the past two weeks and are still in the market for considerable metal. Consumers have been making inquiries, and some sales to them have been closed, but hardly as much as the dealers expected would be the case by this time. Of some grades there is a very small supply of scrap on hand or in sight. Dealers' selling prices are as follows:

Old iron rails, gross	$12 00@$12 50	Axles, net	$14 00@$14 25
Old steel rails, long, gr.	10 50@ 11 00	Cast borings, net	4 00@ 4 25
Old steel rails, short	9 00@ 9 25	Wrought turnings, net	5 50@ 6 00
Old wheels, gross	10 50@ 11 25	Axle turnings, net	7 25@ 7 50
Railroad forge, net	11 75@ 12 00	Mixed steel, gross	7 00
Dealer's forge, net	9 00@ 9 50	Stove plates, net	6 00@ 6 25
No. 1 mill, net	8 00@ 8 50	Heavy melting steel gr.	8 00@ 8 25
Heavy cast, net	7 75@ 8 25	Old iron splice b., net	13 25@ 13 75
Malleable cast, net	8 00@ 8 50		

PITTSBURG.

OFFICE OF *The Iron Trade Review*,
807 TRADESMEN'S BUILDING, Jan. 19.

The gap between billets and Bessemer pig iron has widened still further during the week by an advance in steel and continued weakness in prompt iron. The second quarter is awaited as the time for improvement in Bessemer and most furnaces are refusing to sell beyond March deliveries. A new agreement on steel rails, the movement toward a pooling of tin plate interests and activity in oil country pipe are features in finished material

PIG IRON.—Bessemer iron continues a weak spot in the market, with foundry grades selling at low prices, while gray forge continues at the figures last quoted. Sales of No. 2 foundry are reported at $10 and furnace quotations are $10 to $10.25. Pittsburg gray forge is still close on to the valley price and is quoted at $9 to $9.15. The weakness in Bessemer is more pronounced on spot shipments which are quoted at $9.25 to $9.35 valley and $10 Pittsburg. Several buyers have wanted, in the past week, to cover for the second quarter, and the two steel interests which bought two weeks ago have made attempts, with little success, to extend deliveries to June. But little iron has been sold in the week. Quotations are made as follows:

Bessemer, prompt, valley	$ 9.25 to $ 9.35
" first quarter valley	9 50
Bessemer delivered Pittsburg District	10.00
No. 1 Foundry	10.50 to 10.65
No. 2 Foundry	10.00 to 10.25
No. 3 Foundry	10.00
Gray Forge	9.00 to 9.10

BILLETS.—Billets are stronger. In the Wheeling district $15 has been bid on first quarter deliveries and the same price was declined in the Mahoning Valley. In Pittsburg small sales for quick delivery are reported at $15 but mills ask $15.25 and little steel can be had below this for first quarter delivery. For the second quarter, no quotations are made.

RODS.—The rod situation is tightening and but few rods are available. An unusual series of break-downs in mills has increased the scarcity and in the weeks there has been a scramble for deliveries. Prices quoted range from $23 to $23.50.

SHEET BARS.—Sheet and tin bars are very strong and are quoted at $18 for first quarter shipments.

SHEETS.—The demand in sheets for second quarter continues very heavy but little selling so far ahead being done. On prompt business for No. 28 2c appears to be bottom, in spite of reported sales below this point. Galvanized are quoted at 80 and 5 per cent off list.

PIPES AND TUBES.—The oil country trade holds in prospect a number of good orders which are likely to be placed before long. A pipe line from Coraopolis to the Sisterville, W. Va., fields is a certainty and will call for 130 miles. Another is now being constructed from the gas fields of Washington County to the plant of the Oliver Iron & Steel Co., Pittsburg, for which 12 miles of 12-inch pipe has been bought of the National Tube Works Co. While a large number of buyers persistently use the old base discounts in ordering, the mills quote on the new base which is as follows: Butt weld black, 72 per cent off; lap weld black, 78 per cent off; butt weld galvanized, 67 per cent off; lap weld galvanized, 70 per cent off. Discounts on merchant boiler tubes are as follows: 2¼-inch and smaller, 72½ per cent off; 2½-inch and larger, 75 per cent off. The extra discounts are 10 and 5 per cent. The reported meeting of pipe manufacturers here last week was but a meeting of the executive committee of the manufacturers' association.

PLATES.—Mills quote plates as follows: Tank, 1c; shell, 1.10c; flange, 1.20c. There is some difference in the views of mills. The above quotations are maintained by those best supplied with business. One or two bidders for current business are more aggressive.

STRUCTURAL MATERIAL.—The beam pool has established headquarters in Philadelphia and appointed as commissioner, J. F. Bailey, of Philadelphia. Pool prices are being quoted on new business as follows: Beams and channels, 3 to 15 inches, 1.15c; 18 to 24 inches, 1.25c; zees, 1.15c, and tees, 1.20c. Angles and universal plates are quoted at 1c. The current of buying is strong, small orders predominating. The Riter-Conley Co. has the contract for the addition to the Pennsylvania Tube Works and has bought the 1,000 tons of angles, beams and other shapes of a local mill.

IRON AND STEEL SKELP.—Some good sized sales of skelp are reported, prices ranging about as follows: Grooved iron skelp, 1.07½c to 1.10c; sheared iron skelp, 1.17½c to 1.20c; grooved steel skelp, 92½c to 95c; sheared steel skelp, 1c to 1.02½c.

BARS.—On bar iron several valley mills are asking higher prices, but in competition with Pittsburg mills are still taking business below 1c. Steel bars could be sold ahead but mills are taking the shortest deliveries consistent with keeping plants active. On prompt business prices are weaker and 1c has been shaded in competition. Pittsburg mills generally are quoting 1c.

RAILS AND TRACK MATERIAL.—Within the last two weeks the rail manufacturers have come together again on a price agreement which, for Pittsburg, involves no change—$18 Bessemer being fixed. The same prices govern Eastern mills, while $20 is established at Chicago. Freights can be equalized on deliveries from any mill. It is affirmed that no pooling arrangement is in force, nor is it an attempt to revive the late pool. In substance it is a "gentlemen's agreement." On lighter sections the local quotation is $17, while relaying rails are quoted at $15 and $16. Track material is quoted as follows: Iron track bolts, 1.65c to 1.70c; steel spikes, 1.45c to 1.55c; splice bars, 1.10c to 1.15c; links and pins, 1.15c to 1.20c.

FERRO-MANGANESE. — Domestic ferro-manganese, 80 per cent, is quoted at $47 and $47.50.

OLD MATERIAL.—The heavy inquiry for old material developes litle business but results in higher prices being asked on stocks. In the week iron rails are reported sold at $14 gross and steel rails at $10.75 gross. Prices generally on iron rails are somewhat lower than the sale reported, $13.25 to $13.50 being nearer the local asking price. No. 1 wrought is quoted at $11.50, net; car wheels at $10.50, gross, and cast scrap at $9.25, gross.

IN OTHER MARKETS.

[SPECIALLY REPORTED FOR THE IRON TRADE REVIEW.]

Cincinnati. As the trade gets farther into the month of January it becomes more and more evident that the month is not to be marked by any striking events in the iron market. Thus far there has been a very satisfactory trade, but there has been no very brisk demand and no change in prices whatever. The demand, however, is of such a nature as to be encouraging. As yet few buyers are looking far ahead. Nearly all the buying is for immediate consumption. It is evident that an immense amount of iron is being consumed in all branches of trade. Nowhere is iron accumulating in the yards of the buyers, and when a little brisker movement comes in the spring there may be difficulty in getting Southern iron forward rapidly enough to supply the demand. The sales of the past week have included a good many 100 to 500-ton lots. The rumor of a sale of 5,000 tons of No. 4 Alabama iron to a pipe works is not confirmed. The increase in demand has not served to strengthen prices, but has brought to the front several anxious sellers, both North and South, whose representatives have captured the bulk of the business. The reports received from consumers of pig iron are favorable, and the year starts off in decided contrast to the beginning of 1897. We quote for cash f. o. b. Cincinnati: Southern coke, No. 1 foundry, $9.75 to $10; No. 2, $9.50 to $9.75; No. 3, $9.25 to $9.45; gray forge, $8.75 to $9; mottled, $8.75 to $9; No. 1 soft, $9.75 to $10; No. 2, $9.50 to $9.75; Belfont coke, No. 1, Lake Superior, $11 to $11.50; No. 2, $10.50 to $10.75; Hanging Rock charcoal, No. 1, $14.50 to $15.50; Tennessee charcoal, No. 1, $12.50 to $13; Jackson Co. silvery, No. 1, $12.50 to $13; Standard Georgia car wheel, $14.25 to $15.

Buffalo. Each succeeding week shows shipments on old contracts heavier, sales more frequent, prices firmer and a better feeling all around in the iron market. If this continues an advance can be looked for in the not distant future. On the other hand, many expect the present low selling basis to continue, regardless of the fact that practically every available blast furnace is and has for some time been in active operation and few consumers of pig iron outside of steel plants are running to anything like their full capacity. Prices are firm on the following cash basis f.o.b. cars Buffalo: No. 1 strong foundry coke iron, Lake Superior ore, $11 to $11.25; No. 2, $10.50 to $10.75; Ohio strong softener, No. 1, $11.50 to $11.75; No. 2, $11 to $11.25 Jackson Co. silvery, No. 1, $13.50 to $14; Southern soft, No. 1, $11.50 to $11.75; No. 2, $11.25.

Philadelphia Prices on current business in iron and steel are generally at a stand and January is passing without any positive development. There is no indication that higher values will rule in the near future, and all the calculations that give prominence to the large consumption are met by buyers with questions as to the warrant for regarding this rate as likely to prevail throughout the year. The small increase in stocks in December under so heavy a production is generally accepted, however, as significant of the drift of things. There is nothing in the attitude of buyers as yet to indicate that they look for any marked inroad on stocks in the first quarter of the year. Some of them are holding off in the belief that they can do better in the next few weeks. In general producers of pig iron are not pressing sales, but concessions of 15 to 25 cents a ton are believed to be possible from quotations, particularly on the part of sellers who become apprehensive at any reduction of the amount of orders booked ahead. Shipments on contracts are steady. We quote for seaboard delivery: No. 1 X foundry, $12 to $12.25; No. 2 X foundry, $11.25 to $11.50; No. 2 plain, $10.75 to $11; standard mill iron, $10.50; ordinary, $10 to $10.25; basic, $10.75 to $11. The steel market is dull, like that for pig iron, with $17.15 to $17.25 asked for first quarter. Finished material shows some activity. Since the placing of several thousand tons of shipyard work recently the price of plates is a trifle firmer. Some business placed a fortnight ago was at a shade under 1.10c, but 1.15c is now generally quoted. There has been considerable inquiry for sheets and quite a little business is said to have been placed with Pittsburg mills. Structural work in prospect is of good volume and on shapes agreed prices are held. Beams and channels are quoted 1.30c; steel bars, 1.15c; refined bars, 1.15c; common iron, 1.10c; angles, 1.20c, seaboard deliveries.

THE General Electric Co. is reported to be preparing plans for one of the largest iron foundries of the country, to be located at Schenectady, N. Y. It will be 500 feet long and 130 feet wide.

THE IRON TRADE REVIEW

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JANUARY 20, 1898.

LATEST COMBINATION MOVEMENTS.

The record of the American iron trade in 1898 is not to be so free from history of agreements and combinations as conditions of but a short time past seemed to promise. The year opened with the beam pool revived, and with the plans for the wire combination maturing as rapidly as the immensity of the undertaking would permit. With less than three weeks of January gone, the announcement comes of an agreement on steel rail prices, though without the re-establishment of the pool or its allotment feature. Meantime the pipe and tube manufacturers are maintaining prices with more success, in the main, than has attended other like efforts. At the same time the Lake Superior producers of Bessemer ores are planning for an agreed price in 1898, the only real uncertainty being whether the Mesabi ores shall be included; and along with the partial dissolution of the Superior Charcoal Iron Co., the single selling medium of eight Lake Superior producers of charcoal iron, is the announcement of the continuance of the arrangement so far as three furnace companies are concerned.

The latest proposition in the direction of combination, and one of the most ambitious projects that has been brought forward as yet, next to the wire rod consolidation, is that which would organize a single company to acquire the tin plate plants of the country. Certainly nothing would be lacking to give this industry a typical end-of-the-century career, should it round out its six years with such a concentration and combination of its remarkable energies. It would be a unique illustration of the possibilities of industrial America to see tin plate manufacture, that only five years ago was declared to have no existence on this side of the water, so swiftly pass through every stage of development—with hostile legislation succeeded by undue expansion and hurtful competition—until the very decade marked by its birth should also see it reach this full flower of our latter-day industrial evolution.

The rapid increase in our capacity to produce tin plate is one of the marvels of the late depression. At the end of last June, as was estimated by Col. Ira Ayer, the Treasury Department statistician on tin plate, the capacity of mills built and then building was 650,000,000 pounds a year. The statistics of construction at the end of 1897 showed 223 finished hot mills, with 68 more in course of erection. Thus the capacity likely to be effective by the coming fall will be 291 hot mills, capable of producing 873,000,000 pounds of tin plate a year, counting 30,000 boxes to a mill. The total estimated consumption in the fiscal year ending June 30, 1897, including 105,161,471 pounds of imported plates not re-exported was 552,143,534 pounds. So that, even when the importation of plates for re-export has ceased, there will be a large excess of producing capacity, for which an outlet must be found in foreign markets. Pending the development of this trade a low level of prices at home is to be expected, and here is found the stimulus to the effort now put forth by certain manufacturers to bring the industry under control.

Predictions vary, as in the case of the rod combination. In comparison with the prodigious amount of planning and negotiating bestowed on the wire mill problem, the tin plate project is well nigh formless. Yet the situation has grown acute since the unsuccessful effort to maintain agreed prices last year, and it is not to be denied that the combination cure has its attractions to concerns weakened by the sharp competition ruling to-day. Some relief from the present condition, such companies must have. The scheme proposed involves many chances of failure. It may eventuate as a copy of some of the familiar pools in the history of the iron trade. But if the opinion of competent judges is to be taken some form of combination calculated to work important economies in production and in distribution is more than a possibility.

The only definite action of the Pittsburg meeting, thus far, is the appointment of a committee of four to conduct negotiations looking to the amalgamation of interests. It is said by those prominent in the movement that the co-operation of all the mills will not be essential to success. The purchase or erection of steel plant and of bar mills is one feature of the project. The reduction of cost to the lowest point, to the end not only that drawback plates may be displaced by the home product, but that an export trade may be speedily built up, is made much of in the preliminary discussion of the plan.

THE probability of the erection of additional rod mill capacity in the event of the successful termination of the American Steel & Wire Co. deal has been referred to in a general way in these columns. There has been not a little inquiry in this direction lately by practical men, in command of ample capital, who expect that the readjusting process following the forming of the big combination will drop a good many officers of existing companies from the positions they have long occupied. The Garrett rod mill has no patent protection, and the principal features of the most advanced construction that are covered by patents which the combination will hold

are the sloping standings and the Edenborn reel. While these are important improvements they are by no means indispensable to large and economical production. The field is regarded sufficiently inviting to make it quite certain that a considerable tonnage of wire rods will be manufactured under non-combine auspices within a year after the amalgamation project becomes effective. Meanwhile the financial features of the new movement have proved easiest of adjustment. The preferred stock, which carries also with every share a certain amount of common stock, has been considerably over-subscribed.

THE CLEVELAND DISTRICT.—Continued from Page 3.

the Bessemer basis. Gray forge is sold at $8.75, delivered at valley mill. Southern brings $9.50 for same delivery. With this disparity, buying of the latter is confined to the actual necessities of workable mill mixtures. We quote f.o. b. Cleveland:

Bessemer	10 15	Valley Scotch No. 1	$10 50@10 65
No. 1 Strong Foundry	10 25@10 50	Valley Scotch No. 2	10 00@10 15
No. 2 Strong Foundry	9 90@10 15	Gray Forge	9 25
No. 3 Foundry	9 25@ 9 50	Lake Superior Charcoal	11 50

Finished Material. Some business block construction is under discussion locally that will require 3,000 to 4,000 tons of material all told, and shipyards are making bids on a large steel freighter. A fair run of orders in bars, plates, tubes and sheets is reported, with prices unchanged—certainly no additional firmness. Plates are quoted 1c Pittsburg for tank, with here and there a buyer who has done a shade better. Bars continue at .95c to 1c valley, with the latter price commonly quoted on steel by Pittsburg mills. Higher prices for wire rods are noted, with local sellers well sold up. Wire is quoted at $1.20 and wire nails $1.40, Cleveland.

A New Superior Charcoal Iron Co.

The Superior Charcoal Iron Co., of Detroit, Mich., which since April 1, 1897, has sold the output of eight producers of Lake Superior charcoal iron, was dissolved last week. It is succeeded by the Superior Charcoal Iron Co., of Grand Rapids, Mich., with Wm. G. Mather, who was president of the Detroit company, as its president. The new company will sell the product of the Pioneer Furnace, Gladstone, Mich.; the Elk Rapids Furnace at Elk Rapids, Mich., and the Antrim Furnace at Mancelona, Mich. The five companies whose withdrawal led to the dissoluton of the original organization are the Ashland Iron & Steel Co., Hinkle Furnace, Ashland, Wis.; Gaylord Iron Co., Gaylord Furnace, Detroit; Spring Lake Iron Co., Spring Lake Furnace, Fruitport, Mich.; Peninsular Iron Co., Peninsular Furnace, Detroit, and Union Iron Co., Union Furnace, Detroit. The price of charcoal iron has been gradually reduced in the past year, to meet the competition of coke malleable, and at length reached the point at which some of the companies were no longer realizing any profit from their connection with the selling organization. Some of these furnaces are not now in operation, and there is no promise of their early resumption. Nearly all, however, have stocks of iron, and new selling arrangements are already announced in some instances.

Well-Known English Steel Masters Here.

E. P. Martin, of Dowlais, Wales, president of the Iron and Steel Institute, and E. Windsor Richards, of the Low Moor Iron Works, Bradford, Eng., past president of the Institute, are now in the United States on an inspection tour. They visited Pittsburg steel plants last week and will spend some time in going to other important works.

After an inspection of the Connellsville coke plants, the visitors returned to Pittsburg on Tuesday, leaving in the evening for Chicago accompanied by Capt. R. W. Hunt. Mr. Richards is reported to have expressed himself thus to an interviewer: "We have noted with great interest and have been greatly impressed with the manner in which the great Carnegie plant is fitted with all modern improvements and conveniences for the manufacture of iron and steel. The furnaces at the Duquesne plant we consider to be the best we have seen anywhere in the world. It has been a wonder to us how the Carnegie and Bethlehem plants have been able to manufacture armor plates as cheaply as they do. Armor plate at $500 a ton is not high priced. It is far less than is paid by the English Government for the same work. It is our impression that the leading iron and steel works will become larger and larger, so that instead of 40 or 50 plants, the work will be concentrated and be done by six or ten plants. Everything is now moving in that direction, in almost all lines of business, and it is particularly true of iron and steel plants. With your enormous plants turning out iron and steel in such vast quantities at such low prices and doing it for far less money than English ironmasters, it looks much as if the works would be driven out of our hands. This is my fourth visit of inspection to the United States and on three of them Mr. Martin has been my traveling companion, so we are well acquainted with the ground we are going over. After inspecting the plant of the Illinois Steel Co. at Chicago we will go to Joliet, Ill., thence to Cleveland, and Canada, inspecting various plants at the places visited."

J. G. Raymond, superintendent of the twist drill department of the Whitman & Barnes Mfg. Co., Akron, O., died Jan. 18, aged 52.

The Mahoning rolling mill at Danville, Pa., was sold at auction in Philadelphia, Jan. 18, under a trustee foreclosure sale. The works were finally disposed of to R. A. Polk, of Danville, for $39,200. The plant consists of seven pieces of land, with all the plants, etc., upon them.

At Sharon, Pa., stockholders of the P. L. Kimberly Iron Co. have elected the following directors: P. L. Kimberly and Alexander McDowell, Sharon; George G. Stage, Greenville; Alexis W. Thompson and Thomas W. Phillips, Jr., New Castle. The mills at Sharon and at Greenville will soon resume.

Tennessee Coal & Iron closed the calendar year with a surplus above all charges of a little over $17,000. It is believed that the company was able to clean up its floating debt during the year.

Beginning next Sunday the Illinois Steel Co. will run its South Chicago mills seven days in the week in place of six. The change is necessitated by the congested condition of work. Orders have crowded in so fast that for the next six months the running capacity of the plant will be tested to the utmost.

The January meeting of the Pittsburg Foundrymen's Association, Monday evening Jan. 31, will take the form of a "smoker" and some unusual attractions are in preparation. The regular paper of the evening will be presented by Thos. D. West, of Sharpsville, on the subject of "Oxidation of Foundry Metal." Invitations have been extended to all foundrymen in the neighborhood of Pittsburg and the event will be one of interest.

The burst of activity in the last month of 1897, which found a partial reflection in immensely heavy bank clearings and railroad earnings totals, exercised an appreciable effect upon prices of most staple articles. The opening of the year 1898 found the general average of prices of all leading staple products, as represented by *Bradstreet's* index numbers of 98 staple articles, not only higher than on Dec. 1, 1897, but above the mark set by prices on Jan. 1, 1897. Indeed, it is necessary to go back to Jan. 1, 1895, three years ago, to find an index number higher than that reported at the opening of this year. Of 98 staple articles, comparing as to price on Jan. 1 and Dec. 1, respectively, 27 showed an advance, 23 a decline and 48 remained unchanged.—[Bradstreet's.

HEAVY TIN PLATE PRODUCTION.

Rapid Increase in the Last Fiscal Year.

For the fiscal year ending June 30, 1897, the production in the United States, of commercial tin and terne plates, as reported to the Treasury Department by Col. Ira Ayer, special agent, was 446,982,063 lbs., against 307,226,621 lbs. in the preceding fiscal year, an increase of over 45 per cent. Of the production for the year, 446,924,855 lbs., or practically the entire output, was made from sheets rolled in the United States.

The production for the year, distributed according to kind and weight of plates, was as follows:

Product.	Lighter than 63 pounds per 100 square feet. Pounds.	63 pounds per 100 square feet and heavier. Pounds	Total Pounds.
Tin plates	307,965,826	47,381,844	355,347,670
Terne plates	84,131,032	7,503,361	91,634,393
Total	392,096,858	54,885,205	446,982,063

These figures show that about 88 per cent of the production belonged to the class of plates weighing lighter than 63 pounds per 100 square feet, the proportion being slightly larger than that for the previous fiscal year, which was more than 86 per cent. The report embraces the production of 50 firms, or three less than that for the fiscal year ended June, 30, 1896.

The following comparison shows the records of previous fiscal years:

PRODUCTION OF TIN AND TERNE PLATE.

Fiscal Year.	From American black plate.	Per cent American black plate.	From foreign black plate.	Per cent foreign black plate.	Total.
1891-1892	9 296 553	68.12	4,350,166	31.88	13,646,719
1892-1893	43 599,724	43 68	56,219,478	56.32	99,819,202
1893-1894	85,968,202	61 74	53 255,265	38.26	139 223,467
1894-1895	160,576,934	82 85	33,224,139	17.15	193,801,073
1895-1896	301,002,098	98.62	4,226,523	1.38	307,228,621
1896-1897	446,924,855	99.99	57,208	0.01	446,982 063

The quantity of American sheet iron and steel made by stamping and other manufacturing firms into articles and wares tinned or terne plated was 8,922,061 lbs. The quantity of American sheet iron and steel used in this class of manufactures in the fiscal year ended June 30, 1896, was 10,586,-110 lbs.

The production of black plates in the United States in the fiscal year was 436,438,035 lbs., of which 377,588,412 lbs. was lighter than 63 lbs. per 100 square feet, and 58,849,623 lbs. heavier.

	lbs.
Total production black plates, year ended June 30, 1897	436,438,035
Total production black plates, year ended June 30, 1896	334,014,798
The difference is	102,423,237

Showing an increased production of more than 30 per cent.

The production of such plates lighter than 63 lbs. per 100 square feet is 86.5 per cent, as compared with 77 per cent during the preceding year. Thirty-six rolling mills were producing black plates during the fiscal year ended June 30, 1897, the number being the same as during the previous fiscal year.

Of the 50 firms reported as producing commercial tin and terne plates, only one used foreign made plates during a portion of one quarter, the amount being 57,208 lbs., out of a total production by the firm for that quarter of 213,687 lbs.

Of the 53 firms reported as producing commercial tin and terne plates during the fiscal year ended June 30, 1896, 50 used wholly American rolled sheets and three used both American and foreign, with an aggregate output of 15,503,-154 lbs. Of this amount, 4,226,523 lbs., or about 27 per cent of the output, was made from foreign rolled sheets.

IMPORTS AND EXPORTS.

The quantity of tin plates and terne plates imported into the United States and entered for consumption during the fiscal year ended June 30, 1897, stated by quarters, was as shown below:

Quarter ended—	Lighter than 63 lbs. per 100 sq. ft. lbs.	63 lbs. per 100 sq. ft. and heavier. lbs.	Total lbs.
September 30, 1896	77,027,181	1,527,595	78,554,776
December 31, 1896	46,014,920	1,359,915	47 374,535
March 31, 1897	60,672,974	402,802	61,475,676
June 30, 1897	56,605,371	496,943	57,103,3 4
Totals	240,320.446	4,087,155	244,407,601

The quantity of tin plates and terne plates on which duties were paid, and which were used in the manufacture of articles exported with benefit of drawback, during the same period, stated by quarters, was:

Quarter ended—	Lighter than 63 lbs. per 100 sq. ft. lbs.	63 lbs. per 100 sq. ft. and heavier. lbs.	Total lbs.
September 30, 1896	38,954.434	124,3~6	39,079,810
December 31, 1897	32,905.773	63,394	32,969,167
March 31, 1897	32 998,401	19,645	33,018 026
June 30, 1897	34,156,207	22,920	34,179.127
Totals	139.014.8 5	231,315	139,246,130

The foregoing figures show:

	lbs.
Total imports during fiscal year ended June 30, 1897	244.407,601
Total exports same period	139.246,130
Net imports	105,161,471
Total domestic production	446.982,063
Approximate consumption in United States	552 143.534
Average annual capacity of mills completed June 30, 1897, say	600,000,000
Same of mills completed and in process of construction June 30, 1897, say	650,000,000

A Proposed Tin Plate Combination.

Tin and Terne has the following important account of a project for such a consolidation of tin plate plants as is now being worked upon in the wire trade. In its report of the recent meeting of tin-plate manufacturers at Columbus, O., our contemporary says:

The meeting went into a general discussion of trade conditions, the decided drop in prices during the last year, without a commensurate decrease in cost of production, being strongly brought out. Prices were stated to be such that only the favored mills could make a fair return on the invested capital, while the completion of mills now in course of erection seemed likely to make the conditions worse. It was suggested that if the tin plate manufacturing plants of the country were a unit as regards their operations, the sale of their product might, by means of the attendant reductions in cost of manufacture, soon be pushed into the American market now held wholly by the "drawback" plates, and later into some of the more favorable foreign markets. A committee representing some of the largest and most influential concerns in the trade, was appointed, being given full power to consider any plans for the betterment of the tin plate trade, on this or other lines. This committee is to report at another meeting of the association, called at the same time as the Columbus meeting, for Pittsburg, on Tuesday the 18th instant.

This committee held its initial meeting at the Hotel Henry Pittsburg, on Wednesday of last week, the 5th instant. After a full discussion of the subject in its different bearings, including the prices which should be charged for crosses and extras, the failure of previous "gentlemen's agreements," etc., it was concluded that, if it could be consummated, a syndicating of all the tin plate plants of the United States on the same basis which is now being attempted in the wire trade, offered the most satisfactory solution of the problem. The plan adopted by the committee as worthy of investigation and consideration by the association was that of incorporating a single company which should purchase with stock or cash, or both, all the plants, as well as arrange for the necessary steel for raw material, either by control or purchase of present steel plants, or the erection of a new one. Immediately following the Pittsburg meeting, the committee held another meeting in Chicago, at which meeting the details were brought to such a state that the assurance that the capital which it was deemed would be needed to put the plan in operation became the next matter of importance, and a meeting was therefore arranged for Wednesday of this week, the 12th, with New York capitalists, who were expected to furnish the funds necessary for the purchase, or partial purchase, of such plants as could not be secured for stock in the new company alone, as well as for the purchase or erection of steel making capacity, should that be found necessary or desirable. This meeting was called for New York, and at the time of going to press we have no advices as to its proceedngs.

Addition has been made to the personnel of the committee as originally constituted, but from present advices the members represent concerns having respectively the following number of tin plate mills either completed or in course of erection: 4, 4, 6, 8, 10, 14, 18, 20, 26, or a total of 110 tin plate mills. There are now 302 tin plate mills in the country, completed or contracted for, so that the committee represents something over one-third of the total. It cannot be asserted positively that even all the mills here enumerated will finally subscribe to the plan in toto, but even last week it was claimed that assurances were in hand from two-thirds of the mill capacity of an endorsement. This claim is the more remarkable from the fact that even at that time some at least of the mills had not been advised of the formulation of the plan.

CONNELLSVILLE COKE IN 1897.

The shipments by Connellsville coke operators in 1897 were 6,915,052 net tons, as given by the Connelsville *Courier*, in its annual review of the trade in that region. The *Courier* estimates the average price on this output at $1.65 a ton, though this is probably above the actual, as most of the furnace coke—which is over 85 per cent of the Connellsville output—sold at $1.40 to $1.50 and under. The *Courier* makes the following tabulation showing the total number of ovens at the close of each year, the annual output, average price and gross revenue of the region from 1880 to date:

Year.	Total Ovens.	Tons Made.	Average Price.	Gross Revenue.
1880	7,211	2,205,946	$1.79	$3,948,643
1881	8 208	2,639,002	1.63	4,301,573
1882	9,383	3 043,394	1.47	4,473,889
1883	10,176	3,552,402	1.14	4,049,738
1884	10,543	3,192 105	1.13	3,607 078
1885	10,471	3,096 013	1.22	3,777.134
1886	10,952	4,180,521	1.36	5,701,086
1887	11,923	4,146,389	1.79	7,437,669
1888	13.975	4,915 553	1.19	5,884,081
1889	14,458	5,930 448	1.34	7 974,663
1890	16 020	6,461,156	1.91	12,537.370
1891	17 204	4,760,665	1.87	8,903,454
1892	17 256	6,329,452	1.83	11,598,497
1893	17 513	4,801,623	1.49	7,141,031
1894	17,834	5,454,451	1.00	5,454.451
1895	17,947	8,244,438	1.23	10,140,658
1896	18,351	5,411,602	1.90	10,282,043
1897	18,628	6,915,052	1.65	11,409,835

Following is the output in short tons for 1897 by months compared with that of the two preceding years:

Month.	1895.	1896.	1897.
January	695.060	617,458	485,624
February	599 653	529.347	466,206
March	779,528	550,407	521,484
April	550,309	547 625	493.027
May	559,002	528,822	501,857
June	654 033	4 7 227	500,483
July	6 9.747	470,988	583 867
August	729,044	340.458	562.703
September	664.310	257.547	625 902
October	765,812	304 998	717 498
November	789 080	323.419	700 352
December	768,. 67	473,296	756 019
Total	8,244.438	5.411,602	6,915,052

"During the year the water supply entered seriously into the problem of making coke. In the fall months the drouth was the most severe ever encountered in the history of Connellsville coke making. Many plants had to shut down and others were crippled. The car supply was even more in evidence as a hindrance to the growing production. The shortage began to show itself as soon as the coal strike in the Pittsburg district was broken. The glut of the railroads first caused the famine and by the time that was broken the shipments of grain from the West caused a demand for transportation facilities in the Western and Central belt and the East suffered proportionately. The phenomenal shipments of grain have not ceased and the car famine is still one of the puzzles in the Connellsville region. As a consequence of the deficiency in the car supply, there is a considerable quantity of coke stocked upon the yards at present. The year saw the successful operation of the by-product plant of the Dunbar Furnace Co. at Dunbar, where 50 Semet-Solvay ovens were constructed in 1896 and operated continuously from the time of their completion. It is the company's intention to increase the plant to double its present capacity in the spring. The only other new idea in coking is Fred C. Keighley's 'continuous coke oven,' a test of which is being made at Oliver works. The trial oven was fired last week and is making coke this week."

SINCE the dissolution of the combination of Lake Superior charcoal furnace companies, the sale of the entire product of the Hinkle furnace at Ashland, Wis., has been given to Rogers, Brown & Co., of Cincinnati, and their branch houses.

THE charter asked for some time ago by the Pennsylvania Car Wheel Co., of Pittsburg, was granted last Saturday. The incorporators are: Joshua W. Rhodes, Allegheny; William L. Elkins, James D. Rhodes, Pittsburg; Charles V. Slocum and Alexander W. Slocum, Buffalo.

CONDITION OF BLAST FURNACES OF U. S.*

Jan. 1, 1898.

Location of Furnaces.	Coke and Anthracite.					Charcoal.				
	Total No. of Stacks.	In Blast.		Out of Blast.		Total No. of Stacks.	In Blast.		Out of Blast.	
		Number.	Weekly capacity.	Number.	Weekly capacity.		Number.	Weekly capacity.	Number.	Weekly capacity.
New York	18	4	5318	14	7262	5	1	100	4	448
New Jersey	5	2	1551	3	1327	.....	.....	.....	.....	.....
Spiegel	3	2	473	1	100	.....	.....	.....	.....	.....
Pennsylvania:						13	1	55	12	695
Lehigh Valley	37	8	3900	29	13170	.....	.....	.....	.....	.....
Spiegel	1	0	0	1	700	.....	.....	.....	.....	.....
Schuylkill Valley	18	5	3295	13	7728	.....	.....	.....	.....	.....
Upper Susqu. Val	5	2	2270	3	1780	.....	.....	.....	.....	.....
Lower Susqu. Val	9	4	4362	5	3102	.....	.....	.....	.....	.....
Spiegel	1	1	415	0	0	.....	.....	.....	.....	.....
Lebanon Valley	12	4	3008	8	4484	.....	.....	.....	.....	.....
Pittsburgh	28	27	58214	1	2450	.....	.....	.....	.....	.....
Spiegel	2	2	1115	0	0	.....	.....	.....	.....	.....
Shenango Valley	17	11	16308	6	3260	.....	.....	.....	.....	.....
Jun. and Con. Vals	14	5	7382	9	4969	.....	.....	.....	.....	.....
Spiegel	1	1	543	0	0	.....	.....	.....	.....	.....
Youghiogheny Val	3	1	1305	2	1900	.....	.....	.....	.....	.....
Miscellaneous	5	3	2477	3	1789	.....	.....	.....	.....	.....
Maryland	5	3	4104	2	1762	4	0	0	4	574
Wheeling District	9	9	10367	0	0	.....	.....	.....	.....	.....
Ohio:						9	0	0	9	730
Mahoning Valley	11	10	15098	1	800	.....	.....	.....	.....	.....
Central & Northern	11	10	14190	1	1165	.....	.....	.....	.....	.....
Hocking Valley	2	0	0	2	850	.....	.....	.....	.....	.....
Hanging Rock	12	6	2218	6	1415	.....	.....	.....	.....	.....
Indiana	1	0	0	1	130	.....	.....	.....	.....	.....
Illinois	16	12	24701	4	4900	.....	.....	.....	.....	.....
Spiegel	1	1	880	0	0	.....	.....	.....	.....	.....
Minnesota	1	0	0	1	629	.....	.....	.....	.....	.....
Wisconsin	4	3	3211	1	770	2	1	900	1	180
Missouri	3	1	1082	2	700	1	1	370	0	0
Colorado	3	1	1361	2	3640	.....	.....	.....	.....	.....
Virginia	21	8	5332	13	8564	4	0	0	4	417
Kentucky	6	4	2020	2	1450	3	0	0	3	300
Alabama	32	18	19778	24	13600	12	1	492	11	2465
Michigan	.....	.....	.....	.....	.....	15	6	2653	9	3410
Tennessee	13	5	4688	8	4109	9	2	417	7	2200
Georgia	2	0	0	2	960	3	1	300	2	360
North Carolina	2	0	0	2	600	.....	.....	.....	.....	.....
New England	.....	.....	.....	.....	.....	11	2	158	9	858
Texas	.....	.....	.....	.....	.....	4	0	0	4	970
Utah	.....	.....	.....	.....	.....	1	0	0	1	175
Oregon	.....	.....	.....	.....	.....	1	0	0	1	275
Totals	334	172	222166	172	100043	97	16	5442	81	13717

SUMMARY.

Fuel.	In Blast.						Out of Blast.			
	Number.			Weekly Capacity.			Number.		Weekly Capacity.	
		Month Previous.	Year Previous.		Month Previous.	Year Previous.		Month Previous.		Month Previous.
Charcoal	16	19	19	5.442	5.061	5.456	81	78	13.717	14.406
Coke and Anthracite	172	172	135	221,169	220,963	154,264	172	170	100,043	97,503
Total	188	191	154	226,628	226,024	159,720	253	248	113,760	111,909

*The above table is condensed from the *Iron Age*. The tables of the *American Manufacturer* show in blast Jan. 1, 190 furnaces, with 227,979 tons weekly capacity instead of 226,608 as above.

THE Wilkes rolling mill at Sharon, Pa., is expected to resume the manufacture of muck bar next week.

IN the United States Court at Pittsburg last week the J. C. McNeil Co., of Akron, O., made application for the sale of the former Moorhead-McLean plant at Pittsburg on a mechanics' lien for $10,000. The Soho furnace belonging to the plant is now being operated under lease by Laughlin & Co., Ltd., of Pittsburg.

THE American Pig Iron Storage Warrant Co. put in yard 8,900 tons in the 10 days ending Jan. 10 and in the same time 2,300 tons was withdrawn, making the total of stocks Jan. 10, 282,400 tons.

AN important contract has been awarded the Bethlehem Iron Co. by the United States Government. It is to forge, finish and mount 15 four-inch guns for the United States Navy. The guns are to be of the rapid-firing style. This is the first contract awarded to any one concern for the entire manufacture, finishing and mounting of the guns. On other contracts the company forged the guns, which were afterward finished and mounted at other establishments. Work on the contract will begin at once.

LAKE SUPERIOR IRON MINES.

The annual supplement, given with this issue, contains a complete statement of the shipments of iron ore from Lake Superior mines in 1897 and the preceding 42 years. The preliminary figures of last week have been increased by the receipt of official returns from one or two properties on the Marquette range, reported last week from other sources. The total for the year is thus made 12,469,638 tons. The total output of the Lake Superior region from the beginning becomes 120,088,178 tons. It would required less than 10 years like 1897 to take out as much ore as was yielded in the entire 43 years of Lake Superior history. When the enormous drain recently made upon the old-range properties is considered, it can be appreciated that the problem of Bessemer ore supply, outside of the Mesabi, is a more imminent one than many are wont to think.

The active trading in Lake Superior iron mining stocks, especially noteworthy in the fall and early winter, has been succeeded by comparative quiet, the results of the meetings of the companies, many of which are held in January, being awaited. Chandler, which was distinguished by dividends aggregating $12.50, or 50 per cent of par value, in 1897, is not expected to be much of a dividend payer this year. The 1897 dividends were the result of the high price for ore in 1896. At $4.25 for Chandler ore there was a good profit, and the tonnage of sales in 1896 was about equal to that of 1897, though in the latter year the price was but $2.92½. The aggregate of the 1897 dividends was $500,000, or something over $1 a ton on the output. Early in 1897 the stock sold as low as $31 but is now quoted at $38 to $40. Lake Superior Iron Co. paid dividends of $2 a share in 1897, on a par value of $25. Sales in the latter part of the year were at $22.50 and $23, but holders generally would ask par. Lake Angeline, par value $25, rose from $60 early in 1897, to $81 at the close of the year. Output in 1897 was nearly 150,000 tons in excess of that for the preceding year, but this large scale of operations was necessary, in view of the low price, and was further stimulated by the interest of the company in the railroad to Presque Isle. Republic Iron Co. dividends in 1897 amounted to $1.50 a share, and the stock has sold at $11 in the last few weeks, with a sale reported as high as $12. Cleveland-Cliffs, just before the dividend of $1 a share (par value $100) in December sold at the highest point in years. The output in 1897 was large—close to three-quarters of a million tons, and the excellent equipment of the company and its vessel and railroad interests give it the benefit of a low transportation cost.

The Commonwealth Iron Co. held its annual meeting in the company's offices in the Wade Bldg., Cleveland, last week and elected the following officers: President, E. W. Oglebay; vice-president, E. H. Harvey; treasurer, Jno. Whitelaw; secretary, C. W. Merrill. The company is developing on a large scale the Aragon mine, of which it took possession last July. New equipment has been purchased, including Webster, Camp & Lane hoisting machinery and Babcock & Wilcox boilers, and improved compressors are to be installed. The Aragon deposit has been known to be a large one, but the output heretofore has not been commensurate with the capacity of the property. It is the intention now to work it actively and to make it one of the important shippers of the Menominee range.

An Ironwood, Mich., dispatch says that at the Norrie mine an advance in wages is announced, effective in February.

The Crystal Falls Iron Mining Co. has been incorporated by James Corrigan, Stevenson Burke, Price McKinney and S. C. Bennett, of Cleveland, to operate the Crystal Falls mine.

The ore dock of the Chicago & Northwestern at Escanaba, which burned in November, will be rebuilt. It will be three feet higher than those now building at Duluth and Two Harbors and five feet higher than the dock under construction at Ashland. It will be 60 feet from mean water line to the floor of the dock and in 1,500 feet of pockets there will be storage capacity for 31,750 gross tons.

Forces at the Lake Superior group of mines—the Burt, Hull and Rust—have been increased of late by 150 men.

At the Section 26 property on the Vermilion range, on which the Oliver Mining Co. is reported to have an option, exploration is going on, in charge of Capt. N. Cowling, formerly of the Pioneer mine.

OUTLOOK FOR THE ENGINE TRADE.

We have addressed a number of inquiries concerning the present outlook of the steam engine business to manufacturers in that line, particularly those located in the Central West. The replies received are not many, but they suffice to establish two propositions.

The first of these is, That in regard to volume of business the engine trade is manifesting material improvement. This, of course, is the crucial test of prosperity, and since its results are satisfactory we may be sure that other conditions will adjust themselves thereto.

The second feature is the demoralization of prices. This is brought out distinctly in three of the four letters, although in our inquiry we made no particular reference to that point. Plainly, therefore, it is uppermost in the minds of manufacturers.

Although in this matter, what is one man's meat is another man's poison, and extravagant profits upon a class of necessities, such as steam engines, are to be deprecated, it is in conformity with the best interests of the community at large that manufacturers should receive adequate compensation for their goods and remuneration for their labors. We have little fear that with a continued improvement in demand the prices will not rectify themselves. This is to be accomplished not by a trust or combination, the idea of which in a line of industry so widely apportioned as the engine trade would be chimerical, but by an appreciation upon the part of builders that good times are coming back again and a sturdy determination by them to stand out for reasonable profits.

As we have before remarked, in the electrical field the hard times have served to introduce economies in manufacturing methods and thus to reduce prices, perhaps for the permanent benefit of the consumer. In the engine industry, however, there were not so many economies feasible to make, and it is reasonable to suppose that ere long builders will be setting themselves about to retrieve a part of their lost monetary ground. At any rate, by the tide of advancing prosperity, the continued sacrifice of values should immediately be checked.—[American Machinist.

THE Johnson Co., of Lorain, O., has notified the Chamber of Commerce of that place that it is ready to deed 150 acres of land as a site for the proposed government armor plate factory. The site offered is a tract of land located a short distance up the river from the company's works and fronts on the river. It is remote enough from the lake shore line to be protected from attack from the direction of the lake and yet, with some dredging, will have all the advantages offered by the harbor and river. A map and topographical survey of the land will be forwarded to the armor plate board, together with such data as are required in a formal proposition.

W. L. DAVIS, Chicago, representative of the Addyston Pipe & Steel Co., of Cincinnati, has moved his office from the Rookery to 419 Home Insurance Bldg.

IN the equity suit of Edward L. Clark and others against the Pittsburg Natural Gas Co. and others, Judge Shafer, at Pittsburg on Monday, made a supplemental decree, directing that Park Bros. & Co., Ltd., pay William Clark's Sons' Co. $43,468.73. The stock of the gas company was largely held by the firms named, and a question arose between them as to the money due for gas consumed.

THE C. M. & St. P. Road has given orders to have 2,000 freight cars built at the West Milwaukee shops, as rapidly as they can be turned out. An addition to the plant, now nearing completion, will increase the capacity of the construction department from 10 to 15 cars per day.

CAR works in general are increasing their business. The Barney & Smith Co., of Dayton, O., has been compelled to refuse work, when quick delivery of cars is asked for, and the Michigan-Peninsular Car Co. has been receiving many orders. The lumber trade has felt the effect of the improved business in cars more than the iron trade, though the iron trade has also been favorably influenced.

Review of the Technical Press.

[Translations, Condensation and Comment expressly for The Iron Trade Review by Dr. Richard Moldenke.]

The Internal Friction of Solid Bodies.—*Baumaterialienkunde, No. 8* contains a critical discussion of the above subject as applied to the study of theoretical mechanical technology. The original article by Prof. Rejtoe is in the Hungarian language. The starting point of Prof. Rejtoe's theory is the hypothesis that the deformation of an incompressible substance, caused by external forces, can only take place when its molecules slide upon each other. As a consequence of this sliding a certain amount of work results due to friction. Not only do the molecules immediately affected slide upon each other, but other more distant ones do the same, consequently they may be said to transmit the force applied. We recognize the internal molecular forces by which this is done as those of cohesion and expansion. In addition to this we have the internal friction which opposes these two forces. The mechanical properties of a material are always characterized by the extent and relation of these forces to each other. In a plastic material the internal friction is always smaller than the cohesion, consequently when the external force becomes greater than the internal friction, deformation up to a certain extent may take place. With brittle material, in which the cohesion is less than the internal friction, rupture takes place when the limit of cohesion is reached, but there is no deformation. The supposition is that the molecules of every substance are polyhedrons of different shapes. When regular, as for instance the sphere, the coefficient of friction of sliding contact is constant; when irregular, allowing a varying contact of the molecules when sliding over each other, the coefficient of friction is also variable. A further difficulty is shown up by the microstructure of metals, the same elements forming groups of molecules of various arrangement. The internal friction of the material will then consist of that of the molecules themselves, and that of the groups of molecules. Prof. Rejtoe divides all materials into two classes, those with constant, and those with variable coefficiency of friction. So far as solid bodies are concerned, there will be six subdivisions depending upon the relation of the internal friction and the cohesion. Furthermore, for coarsely crystalline materials a special subdivision is arranged for, in which predominate the internal friction of the molecules, or groups of molecules, depending upon the nature of the strain.

As to the transmission of the internal stresses, they can only take the direction of lines acting through the center of gravity of the molecules affected. Such lines when plotted from a longitudinal section give us a network characteristic of the material. The direction of the lines of transmission when compared with the original force form an angle which Prof. Rejtoe calls the "angle of effect." This angle, from the nature of the case, must be constant for the same material. It is interesting to observe the transmission and distribution of an external force as shown by such a diagram, for instance the primary forces of tension and compression. Then again the compound forces found in the action of the punching and shearing presses. The diagrams of the components of force acting in the molecules give us a clear view of the kind of strain the individual members of a body are under. For instance in pulling a bar, we observe that only certain symmetrical portions follow the direction of the external force, while others go in an oblique manner. From this we can form an idea of the flow of the particles possible in a solid body. Again rapid fracture when the reduction of area is very marked is also shown up readily. With a compressive force there are also only certain portions of the body which show compression, others wedged between act perpendicularly outward. In shearing and punching there are primary and secondary effects. Much also can be learned about the elastic limit of bodies. Prof. Rejtoe takes an ideal system of spherical molecules, and shows that the interspaces may be changed by external pressure or tension. Modern theories suppose that these spaces are filled with the occulded gases. On straining such a material the tendency on the part of these gases, up to a certain point, is to perform work in pulling back the molecules to their proper position. Beyond the point permanent set takes place, and the elastic limit has been overstepped. Again we know that permanent set occurs only when the external force exceeds the internal friction, and hence the elastic limit is really measured by the first value of the internal friction. Toughness, malleability, and especially hardness, may also be studied in this way, and many interesting and valuable points of information leading to a fuller understanding of the properties of materials are thus obtained.

The Development of Coke Making in France and Belgium.—*Stahl und Eisen*, condenses an article on this subject from the *Revue Universelle des Mines, etc.* In the older systems of coke making the output was rather small on account of the difficulty of keeping the ovens air-tight. Before the present efficient methods were brought out, attempts were made to increase the output by covering the whole surface of the coal with a more or less thick layer of coke-ash, sand or other cheap and refractory material. About 10 per cent of the weight of the coal was taken for this purpose. This process is said to have been quite efficient and is therefore interesting historically. About 50 years ago improvements were made in the construction of the ovens. The floor, side walls and crown were provided with flues to make use of the waste heat and distribute it evenly. In addition to these, other flues were built to pre-heat the air used for purposes of combustion. Greater care was also exercised in closing up the ovens. By-product ovens may be said to have been in use in France and Belgium before their general adoption in Germany, with the difference, however, that no mechanical exhaust was used. The pressure of the gases formed, combined with the natural draft of the chimney, were deemed more safe so far as possible explosions, and a loss of by-products due to the unavoidable entrance of air into the ovens were concerned. Again the action of the exhaust, which could not be regulated sufficiently well to keep pace with the varying production of the gases, was held to be obviated by the use of cooling chambers and washing devices with extra large surfaces. While to-day the necessity of forcing the coking process causes the gases to come off under greater pressure, and for other reasons also it is necessary to apply an exhaust, yet the process described below is claimed to give good results, so far as a yield of by-products is concerned, without requiring a mechanical exhaust. It is therefore cheaper to install. The gases and vapors coming from the ovens go into a main provided with separate valves to each oven. The main is continued by a radiator system for cooling purposes. Next comes a chamber full of crushed coke kept wet by a running stream of water. Then comes a safety chamber which is really a surface condenser, that is, a chamber full of small pipes around which a circulation of cold water is kept, and through which the gases are made to flow. This piece of apparatus is supposed to stop the action of a possible explosion from extending toward the ovens. Why this should be the case is not shown, and if the theory is correct two of the chambers, one after the other, would act better. In some of the Belgian works a very rich coal is used, which means very poor coke. Experiments with additions of leaner coal, while successful, could not be made use of on account of the excessive cost of transportation. The same was true with the addition of ground coke, it being found that to obtain good results, the added coke had to be ground so fine that the cost became prohibitive. Again, making briquettes of the coal was resorted to, and excellent results obtained thereby. The cost was again too high, but in some cases the compression desired was produced by building higher ovens. Upon close study it will be found that the coking process depends less upon the closeness of the particles of coal than upon the range of the decomposition of the hydrocarbons produced, this decomposition yielding particles of solid carbon which may be said to be precipitated into the pores.

Orders for four six-wheel mogul locomotives have been received by the Pittsburg Locomotive Works from the Hoshiu Railway Co., of Japan.

The Colorado Fuel & Iron Co.'s net earnings for the fiscal year ending with June are estimated at about $1,000,000, of which $875,000 will be available for charges and dividends. Bond interest is $381,710. Thus dividends on the preferred stock could be resumed, it is stated, but it may be deemed best to pay off the $500,000 loan made to build the new steel rail mill.

ENGLISH VIEW OF AMERICAN IRON EXPORTS.

We attach much importance to a new factor which has made itself very manifest during the past 12 months—the competition of American iron both at home and abroad. Twelve months ago this competition was felt, but only to a limited extent, and it was generally assumed that it was due to the exceptional depression which was experienced in the United States, and that so soon as this had passed away, prices in America would rise to such a point as would make it unprofitable to continue shipments. The total exports from the United States, which in 1896 were about 100,000 tons, are estimated to reach over 500,000 tons in 1897. The principal items are pig iron and steel rails. The former comes mainly from the State of Alabama, and is shipped from the Southern ports in cotton ships. Being able to carry iron in addition to a full cargo of cotton, it is taken at a comparatively low rate of freight, and in this way it can be laid down at a price to compete with pig iron of British production.

It is necessary now to explain how the American manufacturer has so suddenly come to the front and manifested so controlling an influence over the iron and steel trade of the world. The changes which have taken place in the cost of production in the United States during the last four years are simply marvelous, and could scarcely be credited were it not vouched for on the very best authority. Much is no doubt due to the free use of the wealth accumulated during the period of high prices, and which has been spent in the extension and erection of new works, securing every possible improvement in labor-saving machinery, coupled with economy in every department. And all this has been assisted by the cheap cost of transport over long distances by rail. It will surprise many to learn that coal is much cheaper in America than in England.

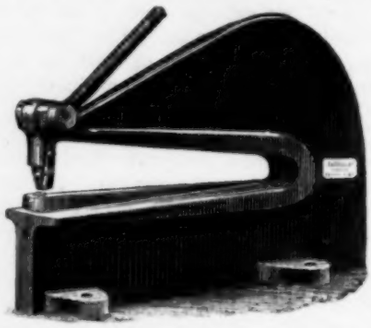
The carriage to the shipping ports of Pensacola and Mobile (a distance of about 270 miles) is only 10s per ton, or about one-half the rates which would be charged in this country. Although pig iron is exceptionally cheap in the Southern States, still, as similar conditions exist in the Pittsburg districts, we can understand how the Carnegie company are able to compete with the makers of English rails at a time when, by a combination, the price has advanced from £3 15s. to £4 10s. per ton. Although considerable quantities of steel bars and billets, wire and other kinds of manufactured steel have been imported, it would appear as if pig iron and steel rails were the departments in which the American makers were likely to have the greatest amount of success.

In face of all the foregoing facts it is all the more remarkable that the English trade was so healthy and satisfactory during 1897. The production of pig iron we estimate between 8,900,000 and 9,000,000 tons, which is the largest on record, and is about 250,000 tons in excess of 1896. Visible stocks were reduced about 400,000 tons, and are probably now about 800,000 tons, which is the smallest stock we have had for many years. Still, with all these satisfactory features, prices of pig iron were not maintained. Scotch warrants are the most reliable standard of values, and these were 48s. 9d. in January, 43s. 2d. in April, 46s. 2d. in June and 45s. 4d. at the close of the year. Manufactured iron and steel became somewhat cheaper during the year. Steel rails, although still under the control of a combination, were allowed to recede about 5s. per ton, under the force of foreign competition.—[London Economist.

Work has begun on Cayuga Island, at Niagara Falls, in preparation for the erection of the Pan-American Exposition buildings. It is said by Richmond C. Hill, secretary of the Pan-American Exposition Co., that the enterprise will involve the expenditure of $3,000,000 to $5,000,000. A conservative estimate of the attendance at the exposition, which is to be held next year, is 4,000,000 to 5,000,000, the secretary says, and adds, "but experts in such matters, being cognizant of the remarkable facilities for transportation afforded by the Niagara frontier and the vast population within a day's ride of this city, estimated at 40,000,000, have emphatically declared that at least 10,000,000 will visit the Pan-American Exposition." The attendance at the World's Fair at Chicago was about 25,000,000; at the Philadelphia Exposition, about 10,000,000.

A DEEP-THROAT PUNCHING MACHINE.

A new 20-inch throat-punching machine is manufactured by the Walker & Allan Machine Works, formerly Walker Bros., of Lansing, Mich. This machine is designed for the use of furnace builders, sheet metal workers, blacksmiths and tinners, and others whose work calls for a deep-throat machine. It is the result of years of experience in the manufacture of hand punches. The makers claim that the machine combines a maximum of elements of strength, durability and convenience, and that it meets the need for a good lever bench punch. The cam is made of the best tool steel and works in long bearings. The immense power is applied perpendicularly, with no lateral strain, making operation comparatively easy on the heaviest work. No adjustment of dies is necessary, as the dies and punches are self-centering and no time is lost in fitting up for desired changes. Details as to prices, illustrated descriptions, etc., will be supplied by the makers, who also manufacture power punches.



Compressed Air Consolidation.

The union of interests of the companies that have been developing the application of compressed air as a motive power, means that its use will be pushed vigorously. These companies are the American Air Power Co., of New Jersey, the General Compressed Air Co., of New Jersey, and the Compressed Air Power Co., of New York. They have been consolidated into the American Air Power Co., of New York, with $7,000,000 capital. The terms of the consolidation provide that the stock of the new concern shall be exchanged for the stock of the old companies, share for share, except in the case of the Compressed Air Power Co., which receives two shares of the new stock for one share of old. The two companies first named are those which have been engaged in developing the Hardie motor. The third company has been working up the Hoadley-Knight motor. The *Railroad Gazette* says: "We judge that this consolidation will result now in a thorough and vigorous and convincing trial, in actual work, of compressed air motors, as applied to city transportation, and that is why we have said that this consolidation is the most reasonable and important thing that has been done recently. The only way to settle this question is to put the motors into service under the conditions which they will have to meet in providing for the hourly needs of a considerable passenger movement, and so ascertain precisely what the advantages and what the weaknesses of this class of motor may be. From what we can learn we suppose that such an experiment will be carried out in New York City very soon. It is the purpose now of a number of influential men interested in this matter to put on compressed air motor cars for regular passenger service on the 28th and 29th st. Crosstown lines, and let them be responsible for handling the business without any help or complication from other classes of motive power. Inasmuch as the gentlemen who control the Metropolitan Street Railway Co. are also considerably interested in the compressed air company, it is reasonable to suppose that such a trial will be put under way shortly and carried out vigorously."

The Connellsville coke trade has been hampered of late by car scarcity, but the shipments have held up well considering this drawback. The week ending Jan. 1 showed 15,272 active ovens, with an estimated output of 153,572 tons, compared with 154,105 in the preceding week. The shipments were 8,205 cars, an increase of 337 cars over the previous week.

SAND-BLAST FOR CLEANING STRUCTURAL IRON.

The application of the sand-blast, in removing the old paint from the 155th St. Viaduct, in New York city, preparatory to repainting the iron surface, was fully described in our issue of Sept. 23, 1897. This viaduct was greatly exposed to the corroding action of hot gases from the locomotives of the Manhattan Elevated Railroad stopping immediately beneath it, and all previous efforts to keep paint upon the structure for any length of time had failed. Though the iron work had received four separate coats of paint in the four years that had elapsed since erection, this paint showed a decided tendency to scale off in an exceedingly short time, and as a consequence the iron was badly rusted and pitted.

The Department of Public Works took the matter in hand, and Mr. E. P. North, M. Am. Soc. C. E., and consulting engineer to the Department, concluded that the chief trouble lay in securing a thoroughly clean surface for the first coat of paint, and the insurance of perfect contact between the iron and the paint. As ordinary wire brush work would not satisfactorily clean the surface the Tilghman sand-blast process was carefully tested. The judiciousness of the application of the sand-blast to similar structures has been publicly questioned; and Mr. North has asked an expression of opinion on this head from a number of engineers competent to judge, and who examined the work in progress, and he has printed the replies received in pamphlet form.

The consensus of these replies, from about 20 prominent engineers, is that the use of the sand-blast for the purpose intended was both wise and judicious. None of these men know of a better method of removing scale, rust and paint from all parts of an iron structure; and most of them add that the wire brush will not satisfactorily perform this work. Mr. J. E. Greiner, engineer of bridges on the Baltimore & Ohio R. R., believes that the cleaning on this viaduct is so effective that the ultimate success of the work will depend solely upon the quality of paint used. Mr. Horace Andrews, City Engineer, of Albany, N. Y., in approving of the method, calls attention to the difficulty of having the metal well cleaned before it is first painted at the shops; and he, with many others, is convinced that all money spent in painting a surface not previously cleaned from rust, is wasted. As a competitive test of different paints, obtained from 17 firms, was one of the objects of the Department of Public Works, the majority of the replies refer to the absolute necessity of first obtaining a clean surface before any just comparison can be made of the quality of the paints applied.

The sand-blast method of cleaning is admitted to be costly; but where thorough cleaning is demanded it seems to be the only process that is at all satisfactory. The statement has been made, says Mr. W. N. Riegner, engineer of bridges on the Philadelphia & Reading Railroad, that metal so treated will rust more rapidly when the hot gases once penetrate the paint, than if it had not been sand-blasted. Mr. Riegner is testing this claim with special reference to train-shed roofs. Two rusted sheets of iron have been taken and the one-half of each cleaned with the sand-blast; each sheet was then painted all over, one with graphite paint and the other with oxide of iron, and the two sheets will be exposed one year. No report has yet been made upon them.

Mr. Layton F. Smith, assistant engineer in charge of bridges of the city of Baltimore, describes a city bridge over the Pennsylvania R. R., at Arglye ave., which is situated between the portals of two tunnels and much exposed to escaping gas and steam. This bridge has not been painted since erection, 20 years ago, and was in a very bad condition. The scale was over ¼-inch thick and the iron and steel pitted to a depth of 1-32 to 1-16-inch. Chipping hammers, steel scrapers and steel brushes were used to clean this bridge, at a cost of about 5 cents per square foot, but the result was not satisfactory. Mr. Smith visited the work in progress at 155th st., and was so convinced of the superiority of the sand-blast method of cleaning structures that he has advocated the purchase of a plant for the city of Baltimore. Mr. Charles M. Mills, of the Department of Public Works, of Philadelphia, says that owing to the irregularity of the bridge members and frequent inaccessible surfaces caused by structural connections, it is practically impossible to thoroughly remove all rust by scrapers and steel brushes, without an expenditure of time and labor that would be considered prohibitory. He added that the cleaning by the sand-blast was complete; and to approach the same degree of cleaning with the scraper, brush and chisel would now cost more than the sand-blast.—[Engineering News.

OBITUARY.

S. M. York, who has been engaged in the manufacture and sale of machine tools in Cleveland for 27 years, died Jan. 14, aged 50 years.

Alvah Mansur, of Moline, Ill., and St. Louis, died at Los Angeles, Cal., Jan. 8, of pneumonia. Mr. Mansur was born Dec. 5, 1833, at Lowell, Mass. Early in his business life he became connected with a large wholesale hardware house in New York and represented it in the West. His first business venture was in the hardware business in Moline, Ill. In 1859 he became connected with the plow manufacturer, Mr. John Deere. At the breaking out of the war he enlisted and served with rank of lieutenant. After the war he engaged in mining in Colorado and served two terms in the legislature of that State. Mr. Mansur at the time of his death was president of the Mansur & Tebbetts Implement Co., St. Louis, and Dallas, Tex.; president of the Mansur & Tebbetts Carriage Mfg. Co., St Louis; vice-president of the Deere & Mansur Co., Moline; president of the Charter Oak Stove & Range Co., St. Louis; president of the Albatross Mining Co., Carthage, Mo. He was also connected with other St. Louis corporations as director and had large lead and zinc interests in the Southwest.

The announcement is made of the death of Burr Kellogg Field, vice-president of The Berlin Iron Bridge Co., at his home in Berlin, Conn., Thursday morning, Jan. 13th, after an illness of less than a week. He was born in May, 1856, entered the Sheffield Scientific School of Yale University in 1874 and graduated in 1877 as a civil engineer. Immediately after graduation he commenced practical work among the railroads of the West. His principal experience was in connection with the laying out and building of the Northern Pacific. Mr. Field had charge of the locating and building of the branch connecting the Yellowstone National Park with the Northern Pacific. In 1882 he was appointed superintendent of bridges in the city of Philadelphia, but resigned the following year to accept a position as assistant engineer of the Berlin Iron Bridge Co., of East Berlin, Conn. His advancement in the company was rapid, and at his death he occupied the position of vice-president with general charge of all the sales. In its announcement of Mr. Field's death the company says: "Mr. Field had no small part in the making of the enviable reputation which the Berlin Iron Bridge Co. now enjoys, and his death will be a severe loss to his associates. He was an indefatigable worker, not only for the company which he had so faithfully served, but in everything he undertook; a true friend of his fellow men, a devoted and earnest worker in the church, a staunch friend to the cause of temperance, active and energetic in every public position that engaged his attention. Mr. Field had a most pleasing manner, and was so honest in all his dealings that he had an enviable reputation among the manufacturing corporations of the country. People who knew Burr K. Field best trusted him most. He is survived by a wife and two small children."

Maj. John Hancock, for 29 years manager of the Black Diamond Steel Works of Park Bro. & Co., Pittsburg, died Jan. 10 at Dehaven, Pa.

Foundrymen's Meeting at New York.

The National Association of Manufacturers has issued a special invitation to the foundrymen attending the meeting in New York, Jan. 26, urging them to attend all the meetings of the Association Jan. 25, 26 and 27, and listen to the reports and papers that will be presented by many of the leading manufacturers of the country. The local entertainment committee, under date of Jan. 13, has extended another special invitation to any foundrymen who may be in New York on Tuesday, Jan. 25, to attend the Bohemian smoker to be given at the Waldorf-Astoria in the evening. Tickets of admission can be secured from Secretary Penton, of the American Foundrymen's Association, at the club house of the American Society of Mechanical Engineers, No. 12 West 31st st. (only a few short blocks from Waldorf-Astoria), between 7 and 8 P. M. of that day.

Present indications are that the meeting to organize a foundrymen's protective association will be successful. An attendance of 100 is expected.

BOLT TAPPING AND DRILLING MACHINE.

A machine for bolt tapping and for drilling is shown in the two illustrations herewith. It has been devised by Wm. A. Timms, of Mt. Vernon, O., who is connected with the motive power department of the Cleveland, Akron & Columbus Railway at Mt. Vernon, O. The apparatus has been in successful operation in the Mt. Vernon shops, in the tapping out of stay bolt holes in fire boxes, some of them using a $1\frac{1}{8}$-inch tap. In the work done of late upon eight fire boxes in these shops not one stay bolt has been broken. The machine has been used also for drilling out the ends of stay bolts in outside casing. It is adapted, also, as will be seen, to boring and drilling purposes in general.

A perspective view of the machine is given in Fig. 1, and in Fig. 2 a side view, partly in section. The rotary engine 2; the pulley 4 on the governor shaft; the pulley 6 on the shaft 7; carrying the master gear-wheel 8; the shaft 10 with the gear-

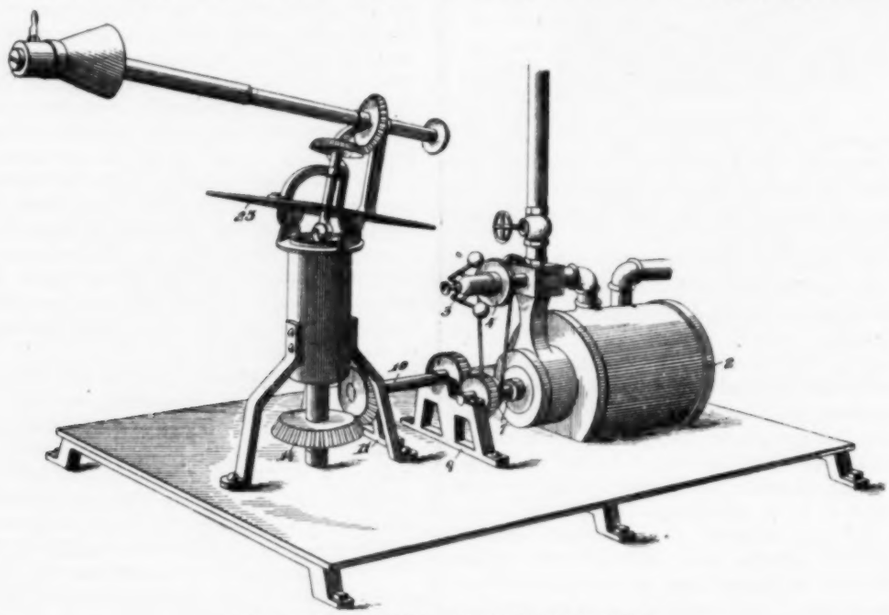


FIG. 1.—BOLT TAPPING AND DRILLING MACHINE.

wheel 12 at one end and the bevel gear 13 at the other, in engagement with the bevel-gear 14, carried by the vertical shaft 15—indicate readily the means of communicating power. The main features of the operating mechanism are the turn table, at the upper end of the cylinder 18; the tilting plate 23; the universal joint 28 by which the table is turned or tilted; and the shaft 31. The gear-wheel 30 is held on the shaft 31 through the medium of a feather which extends along

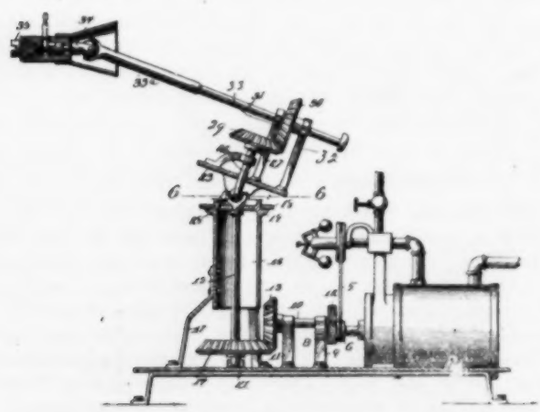


FIG. 2.—BOLT TAPPING AND DRILLING MACHINE.

the shaft. This permits of moving the shaft in either direction on its bearings, by means of the handle 32. The universal joint connections permit of easy and rapid drilling since the drill or tap can be brought to any desired position. This change in position is also made possible by the turn table and tilting plate and the sliding arrangement of the shaft 31 in its bearings.

THE TIN PLATE MARKET.

The market has been a waiting one during the past week and several large specifications are still open because buyers are inclined to hold off for lower prices, which they think will come later on. The talk of some agreement or organization to control prices has not had the result of bringing in buyers nor of closing down pending business, and many in the trade regard this combination talk as the old cry of "wolf." Perhaps the attempt now being made will prove successful, and it would appear that it will meet with no opposition from the large can makers and consumers. All of them, it is to be presumed, would welcome a steady, firm market rather than a falling one as through the past three years, when each large purchase could have been duplicated for less money before completion of the contrnct.

A meeting of the makers was held in Pittsburg Jan. 18 and 19, but at this writing no reports have been given out. This seems the year for combinations and the tin plate industry may go that way; but in view of the large number of mills being built and additions made to older plants, it seems improbable. Meanwhile prices are at the same low level quoted last week:

CHARCOAL TINS.

	IC	IX
Lisvane Grade,	$3.45	$4.20
Calland Grade,	3.65	4.35

COKE TINS.

IC, 108 lb. Basis weight,	$2.95
100 lb. " "	2.85
95 lb. " "	2.80
90 lb. " "	2.75
85 lb. " "	2.70
80 lb. " "	2.65

TERNE PLATES.

IC, 216 lb., 20 x 28	$5.95
200 lb. "	5.65

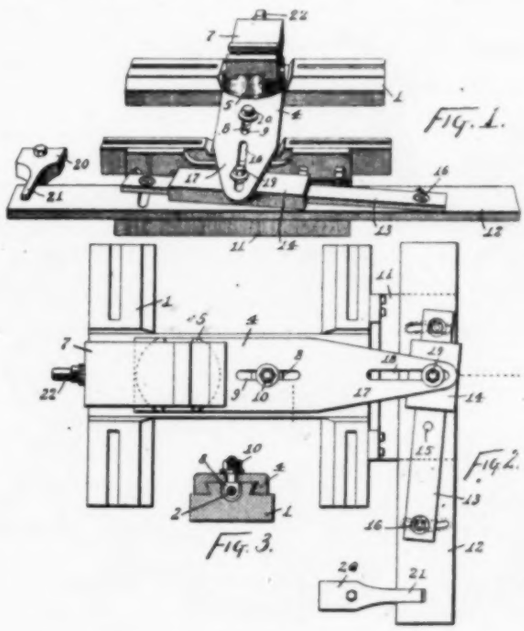
THE names selected for the steel steamer and the two steel barges now under construction at the yards of F. W. Wheeler & Co., Bay City, Mich., for the Bessemer Steamship Co., are Samuel F. B. Morse, John A. Roebling and John Fritz. The plan of giving the vessels of this company the names of eminent engineers, metallurgists and inventors is thus still further carried out.

THE microscopic study of steel is being put to practical use in the investigation of a recent locomotive boiler explosion to determine whether the explosion was due to low water. The water line in the boiler at the time of the explosion is to be determined, if possible, by microscopic study of sections taken from different parts to detect evidence of overheating.

IMPROVEMENT IN TAPER LATHES.

Mr. Lodge, of Cincinnati, whose name is identified with a number of important improvements in lathe construction, has devised recently for the Lodge & Shipley Machine Tool Co. a new device in taper-turning attachments. The Slate attachment, upon which Mr. Lodge has improved, was represented in the main in a construction in which a bar extended from the slipper across the lathe-bed through the carriage, and at its front end carried the bearing of the cross-feed screw. The cross-feed screw had an endwise movement when the taper attachment was in use, but none when the guide-bar was set parallel with the lathe-bed. Other forms were designed by Miles, by Warrall, by Hazlet and Lord and by Johnson. Mr. Lodge has aimed to supply what was lacking in the Hazlet and Lord modification of the Slate construction. The cuts give in Fig. 1 a rear perspective view of the lathe-carriage provided with a taper attachment embodying the Lodge improvements. Fig. 2 is a plan, and in Fig. 3 is a vertical transverse section of the bridge-piece of the lathe-carriage, together with the sliding block and cross-feed. The distinctive features of the Lodge device and their advantages in operation are detailed by the inventor as follows:

"When the taper attachment is not to be used, then clamp 20 is loosened, screw 19 is loosened, and screw 10 is tightened.



Under these conditions tool-block 4 is under the domination of cross-feed screw 2 and the taper attachment is entirely idle and travels with and is carried by the carriage, clamp 20 sliding idly on the lathe-bed and slot 18 moving freely over screw 19 as tool-block 4 is moved by the cross-feed screw.

"When the taper attachment is to be employed, then the carriage is moved to such general position on the lathe-bed as corresponds with the point where the work is to be done, after which clamp 20 is tightened on the lathe-bed. Under these conditions slide-bar 12 and guide-bar 13 no longer travel with the carriage, but as the carriage moves the slipper traverses the guide-bar. The guide-bar is now to be set to the desired angle, after which screw 10 is to be loosened and screw 19 is to be tightened. Under these conditions tool-block 4 is entirely freed from the domination of cross-feed screw 2 and has been bound to slipper 14, so as to be under the domination of the taper attachment and move under the control of the angularly set guide-bar 13.

"It will be observed that the cross-feed screw 2 is mounted as usual in lathes, and that the use of the taper attachment does not require that this screw be dismantled, as in the Miles construction, or that it be arranged for endwise motion, as in the Johnson construction. It will be further seen that the change from normal lathe conditions to taper-turning is readily effected by merely putting into active use either of screws 10 or 19, according to whether the tool block is to be united with the cross-feed screw and freed from the taper attachment or alternatively united with the taper attachment and freed from the cross-feed screw. It is also to be noted that the rear ward projection of clamp-tail 21 into engagement with slide-bar 12 avoids side strains upon the slide-bar, which side strains would have a tendency to interfere with the accuracy of taper-turning. The Hazlet and Lord link connection from the bed-clamp avoided the side strains, but was an otherwise undesirable and complex construction, while the inturning of the end of the slide-bar in the Johnson construction secured simplicity, but formed the slide-bar into a bell-crank lever having a tendency to disturb the accuracy of position of the slide-bar on the bracket-plate."

Illinois Steel Co. Finances.

The financial column of the Chicago *Post* has the following regarding the Illinois Steel Co.: "The annual meeting of the Illinois Steel Co. will be held Feb. 9. Transfer books close Jan. 21 and reopen Feb. 11. According to people in a position to get good information, the statements which will be submitted to the stockholders will make a very encouraging showing. It is said the company is earning nearly $250,000 net per month, and that it has been showing this rate for some months. It has charged off nearly $100,000 a month for the last four or five months on old high-priced ore, yet has been able at the same time to earn its entire annual fixed charges, amounting to $720,000, and reduce its bills payable about $600,000. One of the company's obligations for $1,000,000 comes due the latter part of this month, but it is claimed this can be easily renewed, as the same collateral which was accepted on $1,500,000 borrowed the early part of last year ($500,000 having been paid off in July) is behind the $1,000,000 note. Besides, the note is in the hands of friends of the company. The company is sold ahead to next October, and while the present prices ruling for steel products are perhaps the lowest ever known, they nevertheless admit of a very good profit, owing to the low price of the raw material. According to advices from Boston, Eastern interests that have recently visited the Illinois steel plants are enthusiastic over their size and completeness and the present trade prospects. They claim that the company is now in a position to manufacture steel products as low as, if not lower than, any other steel concern in the country."

Western Foundrymen's Association.

At the meeting of the Western Foundrymen's Association at the Great Northern Hotel, Chicago, Wednesday evening, Jan. 19, 1898, a paper on "The Value of Metalloids in Cast Iron" by Maj. Malcolm McDowell, was considered. Topical questions are announced for early discussion as follows:

9. Is it economical to ventilate a foundry artificially? What has been your experience?

10. What is the best method of lighting a foundry of modern design?

11. Have any members of this Association had any experience with Thurston's Autographic Torsion Machine? If so, does it possess any merit over other forms of machines now in use for testing cast iron?

12. In order to overcome the variation in size of test bars incident to molding, is machining down to size to be recommended?

13. What is your experience as to the effect upon coke of exposing same freely outdoors?

14. What is your experience as to the utility and efficiency of flexible shafting for use with grinders on heavy and intricate castings?

THE Boston subway work is nearly completed. The Boston Transit Commission, in its annual report, says that the work still to be done lies in the section in Scollay Square, the section in Adams Square and the section north of Haymarket Square. Chief Engineer Howard A. Carson reports that 87 per cent of the whole work is finished and 7 per cent more is under contract or ordered. According to present prospects the total cost of improvement will fall considerably within the engineer's estimates. The total cost of the subway to date is $4,043,313.17; the original estimate being $5,000,000. A tunnel under the harbor to East Boston is again being discussed at an estimated cost of $2,406,600.

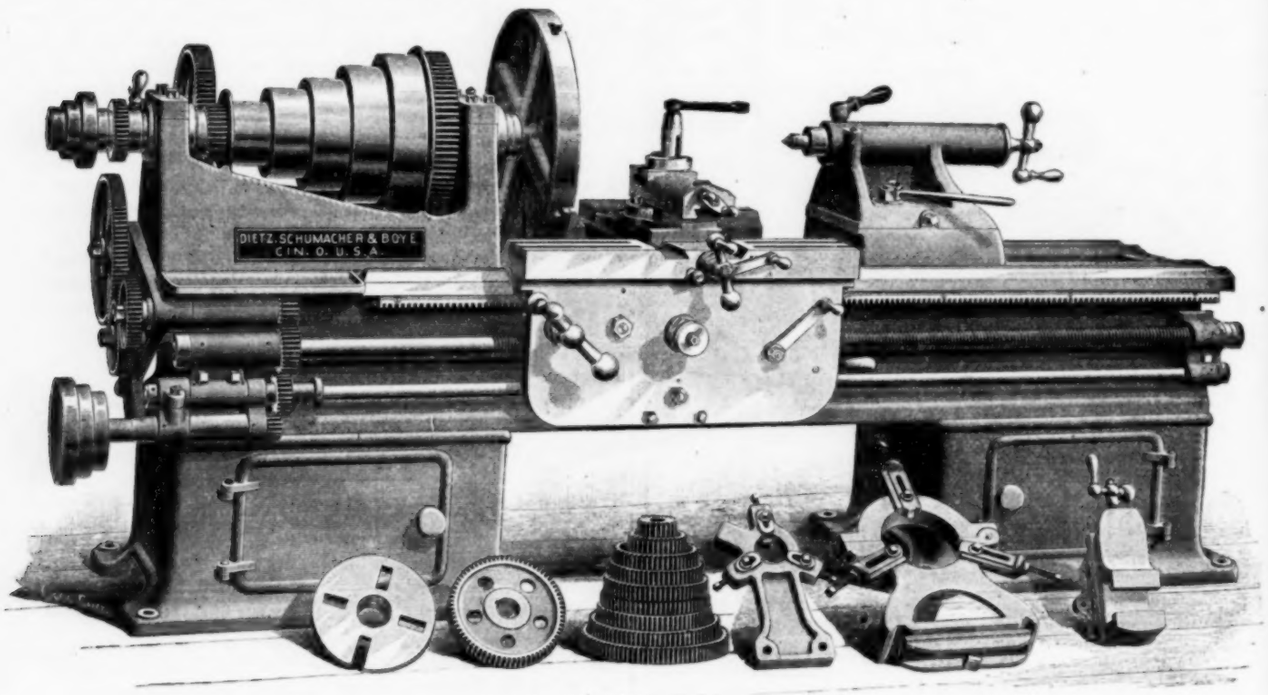
A NEW TWENTY-TWO INCH LATHE.

The 22-inch lathe shown in the cut is built by Dietz, Schumacher & Boye, of Cincinnati, O., and is adapted for heavy work in general.

Emphasis is put upon the new feed device, which enables the operator to use either the belt or gear feed with which very fine or very coarse feeds can be obtained immediately.

The cross feed and length feed can be worked together or separately without injury to the lathe. The rod feed cannot be used if the lead screw is in operation and vice versa. All parts of the lathe are strong enough to stand the maximum strain and the belt will slip before a break would occur.

The lathe is furnished with a compound rest only. A taper attachment of late design is furnished at a small extra cost. Friction countershaft is furnished with each lathe. The weight of the machine on an 8-foot bed is above 4,000 pounds. The head stock is massive and is fitted with bronze bearings. The spindle is large, made of best crucible steel, with hole of 2⅛ inches through the center. The cone has five steps for 3¼-inch belt and is substantially back-geared. The carriage is carried a little above the V's on which the tool block moves, so that the T seats may be of special strength.



A NEW TWENTY-TWO INCH LATHE.

The cross-feed is engaged by pulling a button forward one inch and disengaged by pushing back the button an inch.

CAR WHEEL TESTS AT BUFFALO.

A series of comparative tests of railway wheels will be made by the New York Car Wheel Works and the P. H. Griffin Machine Works, at Buffalo, on Jan. 21, beginning at 9.30 A. M. In making these tests, chilled wheels of special quality and design will be submitted to the tests required in the different European countries for steel wheels, with the intention of demonstrating the comparative value of steel tired and special quality chilled iron wheels for high grade service. The tests required under the specifications of the leading European railways for steel wheels are as follows:

Austrian State Railway Test.—Wheel placed upright on heavy iron and stone foundation. Weight of 475 pounds dropped from varying heights, commencing at one meter (about 3¼ feet), and increasing by half meters to six meters, (about 19½ feet.) Wheel must stand eight blows in all. Test will be continued until wheel is broken.

German State Railway Test.—Wheel placed horizontally on heavy iron and stone foundation. Tapering steel wedge placed in bore. Weight of 475 pounds dropped from varying heights, commencing at one and a half metres (about 5 feet), and increasing by half metres to four metres (about 13 feet). Wheel must stand six blows in succession without bursting. Test to be continued until wheel is broken.

French State Railway Test.—Wheel placed upright on heavy iron and stone foundation. Weight of 2,200 lbs. dropped from a height of four and a half metres (about 14½ feet). Wheel must stand three blows without breaking. Test to be continued until wheel is broken.

The tests required by American railways for cast iron wheels are these.

Master Car Builders' Test.—Wheel placed horizontally on heavy iron and stone foundation. Weight of 140 lbs. dropped from a height of 12 feet on hub. Required to stand five blows. Test to be continued until wheel is broken.

Pennsylvania Railroad Thermal Test.—Wheel laid flange down in the sand and a channel-way an inch and a half wide and four inches deep moulded with green sand around the wheel. This channel-way will then be filled with molten cast iron; two minutes later an examination of the plates will be made. Wheel to be accepted, must not be broken in pieces, and the cracks in the plate, if any, must not extend through the tread.

Bursting Tests.—An axle having wheel seat turned with offsets increasing by $\frac{1}{64}$ of an inch will be forced into the bore of a wheel by the hydraulic press. There will be five offsets which will increase the diameter of the wheel seat by $\frac{5}{64}$ inches over diameter of wheel bore, and pressure will be recorded for each offset. Test will be continued until wheel breaks.

Three tests on axles of standard and special qualities will be made, of which the following are the details:

Test No. 1. The ends of a cold rolled axle will be supported, and pressure brought to bear at the center to bend it out of line and it will then be allowed to spring back. The pressure for each deflection and the permanent set, if any, will be recorded. Test No. 2. Same as test No. 1 on ordinary steel axle of the same diameter, and Master Car Builders' specification. Test No. 3. A 4-inch cold rolled axle, 6 feet 5 inches in length, of the special quality furnished for electric service will be bent cold in the hydraulic press until the ends are brought together. An examination will then be made to see if any cracks appear at the bend.

Note.—All of the wheels tested will be made of special mixtures of iron, and of the weights and diameters recommended by the makers for use under locomotives, passenger cars and 100,000 lb. capacity freight cars. The tests will be witnessed by the members of the Central Railway Club, which holds its meeting Jan. 21 at the Hotel Iroquois. The tests will precede the business session.

INDUSTRIAL SUMMARY.

New Buyers in the Market, and Some of Their Wants:—

[If you are in need of machinery of any description, please notify *The Iron Trade Review*, and we will put you in communication with our advertisers at once.]

The National Shovel & Stamping Mfg. Co. has been incorporated at Chicago, with a capital stock of $100,000, to manufacture shovels and spades. Incorporators are F. A. Sanford, George Mongson, and R. T. J. Matron.

Samuel Jones, president of the Belle Vernon, Pa. Planing Mill Co., desires prices on a 35 h. p. gas engine.

D. Olmstead, Sixth street, Pittsburg, asks price on a 35 h. p. gas engine and a 150 ampere dynamo for electric lighting purposes.

The Universal Sander Co. has been incorporated at Chicago, with a capital stock of $20,000, to manufacture machinery, by C. B. Sampson, H. S. Wilcox and M. C. Wood.

The Chicago Iron & Brass Co. has been incorporated at Chicago, with a capital stock of $7,000, by Henry W. Wallaer, F. E. Von Ammon and Allan C. McIlvane.

The Simplex Engine & Machinery Co. has been incorporated at Chicago, with a capital stock of $20,000, to manufacture engines and refrigerating apparatus, by F. W. James, J. Francis Small and W. D. Sherwood.

The Charles Mulvey Co. has been incorporated at Chicago with a capital of $10,000, to manufacture iron, by Belinda, Mary A. and Charles Mulvey.

The Bourgeois Motor Works, New Orleans, La., is in the market for milling machines, planers, key-seaters, shapers, lathes for turning and boring balance wheels.

At Winterville, N. C., Eugene G. Cox contemplates the establishment of a wire-cloth and fencing plant.

Vance & Kirby, Chattanooga, Tenn., ask prices on a cut-off engine, 150 to 200 h. p.

The Virginia Soapstone Co., Schuyler, Va., wants to buy Rand or Sullivan drill, two and one-half or two and three-quarter-inch cylinder, in good order.

At the office of the Supervising Architect, Washington, D. C., sealed proposals will be received until 2 P. M. Feb. 7, for furnishing all the labor and materials and fixing in place complete a low temperature hot water heating apparatus in the U. S. Custom House and Post Office building at Norfolk, Va.

New Construction:—

A movable bridge, larger than any other in the world, will soon be constructed across the Chicago Drainage Canal. It is to be 410 feet long and 116 feet wide. Its total weight will be 3,800 tons. It will be built on the ordinary revolving plan, with a center pier, but it is planned to use it as a stationary bridge for a term of years, though the exact time has not yet been determined upon. It will cost $317,455. Thirteen bids were opened by the Drainage Board and the awards were made to the King Bridge Co., of Cleveland, for the superstructure, as announced in these columns last week, the price being $225,000, and to Lydon & Drews for the substructure, including the center pier and two abutments, at $92,455. The bridge will cross the canal at 31st street, and will be one of a series, including the South Western avenue bridge, the Kedzie avenue bridge and the Chicago, Madison & Northern bridge, that will be operated from the same electrical power-house. The new bridge will provide for eight tracks, of which two go to the Union Stockyards & Transit Co., two to the Chicago & Northern Pacific and four to the Panhandle system. Its clearance of the high water mark will be 16½ feet. The only other movable bridge in this country approaching this one in size is that of the New York Central over the Harlem River, and its total weight is 2,000 tons.

The Berlin Iron Bridge Co., of East Berlin, Conn., has a contract for a new draw bridge over the South Shrewsbury River, in Monmouth County, N. J. This bridge is to be 180 feet in length and 40 feet wide. The Berlin company has the contract for both the substructure and superstructure.

On the second story will be the pattern room, occupying space of 60 x 100 feet, while the third floor will be used as a storage house. A brass foundry, which will be built next to the machine shop, will be 50 x 100 feet, while next to this structure will be erected the blacksmith shop, 50 x 100 feet. The fitting shop will be 50 x 50 feet. The structures are to have steel skeletons, with corrugated iron roofs and brick walls.

The new plant of the Epping-Carpenter Co., of Pittsburg, will be on 41st, near the Allegheny Valley Ry., in the district of the Lucy Furnaces and of the McConway & Torley Co. plants. The main building will be 100 x 200 feet and will contain a gallery 25 feet wide extending around the interior of the building. The height will be three stories.

The Riter-Conley Co., Pittsburg, has been awarded the contract for the construction of a large addition to the Pennsylvania Tube Works, Pittsburg, on Second ave., to cost in the neighborhood of $50,000. The new mill will be all-steel, 900 feet long and 104 feet span, and will contain 600 tons of steel, which will be furnished by the Carnegie Steel Co. It will be finished in 90 days.

The Hooven, Owens & Rentschler Co., of Hamilton, O., has awarded contracts for the construction of its $60,000 plant to the Columbus Bridge Co., Columbus, O., for the steel work and to J. F. Bender Bros. Co. for the remainder of the building.

At Indianapolis, Ind., the Jenny electric plant which was destroyed by fire will be rebuilt under a new company with a capital stock of $100,000.

The Case Mfg. Co., of Columbus, O., has been awarded the contract for a number of motors and a 20-ton traveling crane for the Old Meadow Rolling Mill Co., of Scottdale, Pa. The plant is being built by former employes of the Scottdale Iron & Steel Co.

The Duquesne Mfg. Co., Pittsburg, is erecting a new plant for the manufacture of bicycles.

The construction of the new dry dock of the Cleveland Shipbuilding Co. at Lorain, O., is practically completed and vessel work will begin within a short time.

The Hawley Down Draught Furnace Co. is planning to establish a plant in Atlanta, making it headquarters for Alabama, Georgia, Florida and North and South Carolina. A $100,000 investment is talked of.

Additions, Enlargements, Removals, Etc.:—

The Griffin Wheel Co. is constructing a large addition to its plant, located at Lake st. and Sacramento ave., Chicago. Ralph and Sumner Sollitt have the contract. The building comprises a foundry 300 feet long, 50 feet wide, and 20 feet high, and when completed this plant will be the largest car wheel works in the country. The building will be constructed of brick and stone, and will cost $14,000.

J. T. Cowling, manager, Powellton, Pa., is reported as saying that his company will make additions to its boiler and engine rooms and install a new 1,000 h. p. engine.

The Dennison (O.) Rolling Mill will add a third set of rolls. A traveling crane may be added.

The Buffalo Steam Pump Works is enlarging its plant, at North Tonawanda, N. Y., preparatory to the manufacture of ice machines and steam fittings, in addition to its present output. It is said that it has entered into a contract with a Buffalo firm to supply a large quantity of ice machines.

Fires and Accidents:—

The plant of the Durango (Col.) Iron Works Co. burned. The works cost about $30,000, and the main loss is in improved machinery and patterns. Insurance $7,000. The company will rebuild as soon as the insurance is adjusted.

At Fort Wayne Ind., the Browser Oil Tank Works recently suffered a loss of $25,000 by fire.

At Greene, N. Y., the Lyon Iron Works were burned, Jan. 4, entirely destroying the machine shop and the molding rooms; estimated loss, $17,000.

General Industrial Notes:—

The Indiana Iron Co., Muncie, Ind., for the past six months has been making improvements in its mills, and is now in position to turn out more work, more economically, than ever before. The output of the plant in the month of December was the largest for a month in the history of the company.

The new steel rail mill of the Colorado Fuel & Iron Co. will be finished early in March and it has sufficient orders for rails to keep it busy nearly all the year. Some of the earnings from this new plant will figure in the report for the year ending June 30. The company's coal and iron business is the largest

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on record and all its furnaces are now in blast. It is calculated that the requirements of its field during this year will be considerably greater than the facilities for production. In every year except 1894 the company has earned double its fixed charges, and in 1894 earned a large surplus over charges. It is only a question of time, it is said, when dividends on the preferred stock are resumed as they are being earned.

The plant of Isaiah B. Coleman at Elmira, N. Y., was burned out last month, but new quarters have been secured equipped with improved machinery. A specialty is made of hand and power elevators, plumbers' brass goods and compressed grease cups for shaft bearings.

The firm of Walker Bros., of Lansing, Mich., manufacturers of engines, boilers, punches and dies, has been dissolved. W. N. Walker retains his interest and is general manager of the Walker & Allen Machine Works, successors to the old firm. R. E. Walker retires, selling his inerest to A. Allan, of Battle Creek, Mich., who becomes secretary and treasurer of the new organization.

The ninth annual meeting of the stockholders of the Illinois Steel Co. for the election of directors and other business will be held at the offices of the company, in the Rookery, Chicago, on Wednesday, Feb. 9, 1898, at 11 A. M. The stock transfer books will be closed from Jan. 21 to Feb. 11.

The Sessions Foundry Co., of Bristol, Conn., has secured recently a number of important contracts for iron castings for the coming year, among them being a renewal of a previous contract with the Providence Steam Engine Co., makers of the Greene engine. This is heavy work and when business is good amounts to many tons per days. The Sessions Foundry Co.'s business last year was the largest in its history, and from present indications will be considerably larger the coming year. The company recently melted 91½ tons of iron in one day and 100 tons more could have been run off had sufficient heavy work been in hand.

The Central Brass Mfg. Co., of Cleveland, has increased its capital stock from $10,000 to $15,000.

In 1897 Eagle mill, at Ironton, O., turned out 8,646 tons of bar iron, 1,407 tons sheet iron and 7,909 tons muck iron. It was in operation 147 days, 103 of which were in the last six months. At the annual meeting of the stockholders last week it was stated that the prospects were brighter for the company than they had ever been at this season of the year. The newly elected directors of the company are: H. A. Marting, S. B. Steece, C. H. Ketter, Wm. Marting, Aaron Winters Leo Ebert, A. H. Mittendorf, Geo. B. Davies, Thos. W. Hughes.

On Jan. 1 the Crane Iron Co.'s No. 1 furnace, at Catasauqua, Pa., was blown in on foundry irons. This furnace has lately been remodeled under the direction of Frank C. Roberts & Co., of Philadelphia, and is now equipped with 12 tuyeres, and Gayley cooling plates. The engines and boilers have also been thoroughly overhauled. No. 3 furnace, at Catasauqua, is now making special low phosphorus pig iron. Some of this iron has lately been running below .020 per cent in both phosphorus and sulphur.

Five furnaces out of the 16 in the Shenango Valley are idle. They are the Ella Furnace and Fannie Furnace, at West Middlesex; Donglas Furnace, at Sharpsville, one of the Sharon Iron Co.'s furnaces, and the Sharon Furnace of Hall, Rawle & Co.

The action of the United States Supreme Court in refusing the application of the defendants for a writ of certiorari in the case of the Sharpsville (Pa.) Furnace Co., vs. Corrigan, McKinney & Co., of Cleveland, puts an end to further litigation. The defendant company paid the amount of the judgment, $15,967.50, and costs of the suit last week.

Every department of the Consolidated Steel & Wire Co.'s plant at Rankin, Pa., has been put in operation. The mills were shut down on Dec. 31 for the annual stock-taking, and to allow the appraisers for the new wire combination to go over the plant.

Stockhus & Carlson, Rockford, Ill., have established a machine shop for general work, and will also make the Skandia lathe.

Bear Spring Furnace, Bear Spring, Tenn., went out of blast Dec. 26; repairs will take place until April 1.

The Reeves Iron Co., Canal Dover, O., have begun manufacturing galvanized sheets rolled from puddled iron.

The Youngstown Car Mfg. Co., Youngstown, O., is very busy. Among contracts under way is one for 28 double hopper bottom gondola cars for the Pittsburg & Western Railroad. The cars are 35 feet in length, and are 60,000-pound capacity. They are to be equipped with Diamond pressed steel bolsters, channel bar spring plank, hollow brake beams, Buckeye couplers, American continuous drawbar attachments and Damascus bronze journal bearings.

The Sloss Iron & Steel Co., of Birmingham, Ala., is now engaged in opening and preparing its new brown ore mines for operation. While the preliminary work is under way, the Southern Railway is constructing its branch road to the mines. Actual operations will probably be begun in about 60 days.

The Ohio Iron & Steel Co. is very busy on orders for its May Scotch pig iron and its books contain business that will occupy the plant steadily nearly four months.

The Steubenville, O., furnace has been blown in.

Furnace No. 2 at Ashland, Ky., has gone in blast, making three now active.

Lawrence Furnace at Ironton, O., was blown in Jan. 10. Olive Furnace in the same district will go in soon.

The Meadville Vise Co., Meadville, Pa., has placed an order for an improved cylinder boring machine with the U. Baird Machinery Co., Pittsburg. An order for similar machine has been placed with the Olds Gasoline Engine works, Lansing, Mich.

William H. Wood, engineer and builder of special machinery, Media, Pa., has recently furnished a hydraulic riveting and flanging plant to the Gaar Scott Co., of Richmond, Ind., and a patent 1,100-pound single standard steam hammer and a hydraulic multiple punch to the Fox Solid Pressed Steel Co., of Joliet, Ill.; also a hydraulic riveting plant to H. B. Beach & Sons, of Hartford, Conn., and a 12-foot hydraulic riveting plant to the Dickson Locomotive & Machine Works, of Scranton, Pa.; one hydraulic upsetting machine and an 18-inch horizontal hydraulic draw bench, 10-foot stroke, both for the National Tube Works, of McKeesport, Pa.; one 800-pound steam hammer to John Muirhead & Son, of Pittston, Pa.; one

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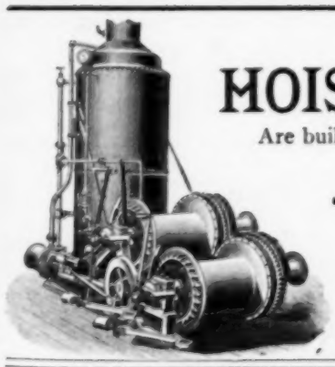

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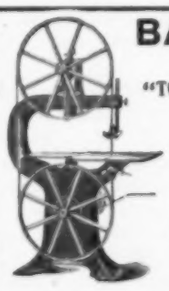

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10-foot hydraulic riveting and flanging plant to the Enterprise Boiler Co., of Youngstown, O.; one hydraulic riveting plant for Borger Bros. & Co., of Columbus, O.

The Oil Well Supply Co., of Pittsburg, will open an office in London. Shipments are being made to the oil fields of Russia, Japan, Sumatra, India and the Dutch Republics.

Four hundred steel ore cars, in addition to 600 already built, will be provided for the Carnegie ore railway—Conneaut to Pittsburg—before the opening of navigation next spring. Steel rails 100 lbs. to the yard, are now being laid on the road, and the new 12-rig plant for direct transfer of ore from vessels to cars at Conneaut is nearing completion. A car dumping machine for transfer of coal at Conneaut is also to be erected by the McMyler Mfg. Co., of Cleveland before the opening of navigation, and a Thew steam shovel for loading ore from dock to cars will be installed at once on the storage dock.

The last month's report of the output at the rod mill of the Consolidated Steel & Wire Co. at Beaver Falls shows that the production was 7,811½ tons of finished roads by a single mill. This, it is claimed, breaks the world's record.

The Whiting Foundry Equipment Co., Harvey, Ill., recently shipped one of its No. 7 cupolas to the Phillips & Buttorff Mfg. Co., Nashville, Tenn., and is building one No. 7 and one No. 9 cupola for the Hooven, Owens & Rentschler Co., Hamilton, O. This company has found it necessary to add to its shop a three-motor electric traveling crane of 15 tons capacity. Every feature in the construction of this crane has been studied, to make it as modern as possible.

The Continental and Elba mills of the Oil Well Supply Co., Pittsburg, are being thoroughly overhauled. A part of the new equipment will be a number of Tonkin patent internally fired water tube boilers.

Two mills of the National Tin Plate Co.'s new plant at Monessen, Pa., were put in operation last week.

Huntington & Lamond, engineers, of the Tradesmen's Building, Pittsburg, are installing two Foote hot blast stoves at the River Furnace of Corrigan, McKinney & Co., at Cleveland. The proximity of the plant to the river makes piling necessary and difficult masonry construction in order to secure a firm bedding for the stoves.

The regular quarterly meeting of the directors of the Davis & Egan Machine Tool Co. of Cincinnati, was held Jan. 12. The officers for the past year were re-elected, Chas. Davis, president; W. H. Burtner, vice-president and treasurer; B. B. Quillen, secretary and general manager. A dividend of three per cent was paid to all stockholders, out of the earnings for the past three months, making a 12% dividend for

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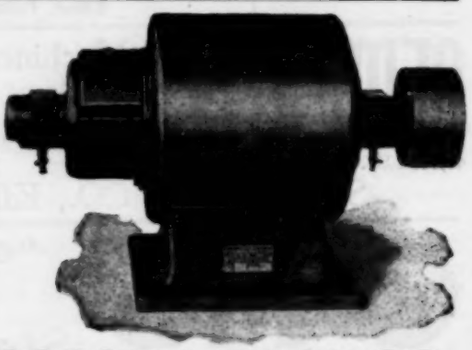

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the year. The company has just received through its London office an order for 20 improved brass workers' lathes, from Dowrance & Co., London, one of the largest brass and iron fittings firms in England, and heavy contractors to the British admiralty.

Homestead, Pa., has offered a bonus of $10,000 for the new plant of the American Ax & Tool Co.

The annual meeting of the Andrews Bros. Co., Youngstown, O., was held Jan. 13, the stockholders electing the following directory: Mrs. Louisa Andrews, Mrs. John A. Logan, Lucius E. Cochran, Leslie C. Bruce, Henry Heedy. The directors elected L. E. Cochran, president, and Henry Heedy, secretary and treasurer.

The $4 pooling rate in Amalgamated Association rolling mills will continue through the first quarter of 1898, the canvass of selling prices made by President Garland and by Secretary Nutt of the manufacturers' association.

At Dunkirk, N. Y., the Brooks Locomotive Works is about completing a shipment of 92 cars of locomotives, boxed in pieces for Japan and Korea. Of this order 20 locomotives are for the Imperial Government Railways of Japan, 12 for the Kiushiu Railway, and 4 for the Seoul-Chemulpo Railway of Korea. These latter are the first engines ever sent to Korea, and are for the first railroad built in that country, concessions for which were obtained by a syndicate of Americans.

Car and locomotive building: The P. & L. E. is reported in the market for 1,000 cars; the Lake Shore has asked bids on 500 drop-bottom coal cars; the Norfolk & Western has placed an order for 300 drop-bottom gondola cars; the Illinois Central has ordered 100 ballast cars; the Michigan-Peninsular Car Co. has an order for 50 refrigerator cars for the Hammond Refrigerator line; the Mobile & Ohio has placed with the Terre Haute Car & Mfg. Co. an order for 300 coal cars; the Southern Pacific has ordered 100 standard ballast cars from the Wells & French Co.; the Ohio Falls Car Mfg. Co. is building 50 flat and 10 box cars for the Altantic, Valdosta & Western. The International & Great Northern buys 15 locomotives from the Rogers Locomotive Works; the Grand Trunk has ordered a number of locomotives from the Baldwin & Schenectady works; the Richmond Locomotive & Machine Works will build 10 ten-wheel compound and 5 simple engines for the Wabash; the Baldwin Locomotive Works will build 5 passenger locomotives for the Wabash; the Hoshiu Railway of Japan has ordered 4 from the Pittsburg Locomotive & Car Works.

The Central Iron & Steel Co., Harrisburg, Pa., has started its mills on full time, orders for steel plates being sufficient to promise considerable work.

The Brooke Iron Co., at Birdsboro, Pa., will blow in its No. 3 blast furnace.

It is reported that the Clifton Iron Co., Ironaton, Ala., will blow in its furnaces in February.

The Bethlehem Iron Co. has blown out No. 5 furnace and is getting No. 2 ready for blast.

At the meeting of the Civil Engineers' Club of Cleveland, held on January 11, M. S. Greenough, member Am. Soc. C. E., addressed the club on "Modern Gas Plants." He briefly reviewed the history of the gas manufacturing industry since its inception near the beginning of the present century and illustrated some of its more important and recent developments. He gave some description of the works of the Cleveland Gas Light & Coke Co., of which he is president and general manager. In the modern regenerative retort, it was said, a very high degree of heat is maintained and the heat produced is thoroughly utilized in a most economical manner. The speaker illustrated the purifying boxes which are at present employed, and described the modern gas holder and frame, which has developed very large proportions and the construction of which has become an important engineering problem. Details were given of a variety of labor-saving machinery by which a considerable economy in the working of the plant is realized; such as apparatus for coal raising and charging, for coke handling and sorting, etc. A description was given of the Coventry inclined retorts for the manufacture of gas by a continuous process, which is aided by gravity. Leaving the subject of coal gas manufacture, Mr. Greenough proceeded to the discussion of so-called water gas and described some works designed for its manufacture. In conclusion he illustrated upon a map of Cleveland the system of distribution employed and the means by which a nearly uniform pressure is maintained under the extremely varying rate of consumption during the hours of the day and night.